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APPENDIX F
SITE ECOLOGICAL CHARACTERIZATION

AR302704

Tonolli Corporation Site
Remedial Investigation/Feasibility Study
Ecological Characterization

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1.0 Introduction

This Ecological Characterization is part of the Remedial Investigation and Feasibility Study (RI/FS) conducted for the Tonolli Corporation Site located in Nesquehoning, Carbon County, Pennsylvania. The Tonolli Corporation Site was listed on the National Priorities List of Superfund Sites in 1989 (Federal Register October 4, 1989).

The Tonolli Corporation operated a battery recycling and secondary lead smelting plant at this location from August 1974 to January 1986 when operations were terminated. The plant received lead acid batteries and other lead scrap materials for processing with lead pigs and ingots the primary finished products. The facility is approximately 30 acres in size and consists of a battery dumping and storage area, battery crushing operation, plastics storage area, smelter, refinery, waste water treatment plant, an above-ground 500,000 gallon storage tank, an abandoned 500,000 gallon butyl rubber-lined waste lagoon, and a 10-acre butyl rubber-lined solid waste landfill.

Components of the Ecological Characterization include study of the terrestrial and wetlands resources contained within the Tonolli Site and a 0.5 mile radius around it, as well as aquatic resources located within stream reaches 0.5 miles upstream and 2.0 miles downstream of the site. These studies included search of existing ecological information held by government agencies as well as walk-through surveys and sampling of the study area. All work was conducted in accordance with the United States Environmental Protection Agency (USEPA) approved work plan.

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2.0 Site Location

The Tonolli Corporation Site is located 800 feet north of State Route 54 within Nesquehoning Borough, Carbon County, Pennsylvania. The site is three miles west of the borough's business district and approximately 25 miles northwest of Allentown, Pennsylvania. It is situated within the center of the Nesquehoning stream valley bounded to the north and south by the Broad and Nesquehoning Mountains, respectively.

Nesquehoning Creek flows along the valley floor from west to east and passes approximately 50 feet to the south of the Tonolli Site. The creek has a drainage area (watershed) of approximately 35 square miles upstream of its confluence with the Lehigh River. The Lake Hauto and Bear Creek Reservoirs, located approximately one mile southwest and northwest of the site, respectively, regulate local stream flow within Nesquehoning Creek.

The 35 square mile watershed area lies in the "Valley and Ridge" province and consists of the following surface characteristics:

Mine Spoil	10%
Urban Development	2%
Residential Development	3%
Undeveloped Area	85%

Of the undeveloped area within the watershed, approximately 95 percent is very heavily forested and approximately 40 to 50 percent of the forested land is mountainous with slopes between 20 and 30 percent (Tonolli Corporation 1985).

In addition to Nesquehoning, major communities within a 3-mile radius of the site include three communities south of Nesquehoning Mountain: Summit Hill Borough, Lansford Borough, and Coaldale. Smaller communities include Bloomingdale, Hauto, and the Lake Hauto development. Approximately 17,000

people live within 3 miles of the site, including 20 residences which are located within one-quarter mile of the facility (NUS Corporation 1986a).

Two municipal water supply authorities that serve these communities are the Lansford-Coaldale Joint Water Authority and the Summit Hill Water Authority. Water supplies are developed from both surface water and groundwater resources.

The Lansford-Coaldale Joint Water Authority derives its supply from two sources which include Bear Creek Reservoir as the primary water supply and two bedrock wells used as a supplemental supply during dry periods. One supply well is located adjacent to the northern portion of Bear Creek Reservoir and the other well is located near Lake Hauto.

The Summit Hill Water Authority derives its supply from four bedrock wells located southeast of the site within the White Bear Creek drainage basin. The wells are topographically isolated from recharge areas which are of significant linear distance (2.75 miles) from the Tonolli Site (NUS Corporation 1986b). Therefore, these wells do not appear to be threatened.

3.0 Objectives of the Ecological Characterization

The Ecological Characterization is a primarily qualitative description of terrestrial, wetlands, and aquatic ecological resources present on the Tonolli Corporation Site proper as well as within a 0.5 mile radius and 2.0 miles downstream for aquatic resources. Objectives of the Ecological Characterization are to:

- Provide an accurate description and understanding of the existing biological resources and ecological values of the site and immediate vicinity;
- Identify ecological resources of special interest (e.g., wetlands, endangered species, or critical habitats) that may be adversely affected by remedial alternatives;
- Identify suitable reference areas for terrestrial, wetlands, and aquatic resources;
- Identify areas where further sampling or monitoring activities may be warranted (i.e., bioassay analyses);
- Identify habitats and fish and wildlife receptors that may be located within the contamination pathways; and
- Provide the ecological information to support exposure and toxicity assessments.

4.0 Scope

The Ecological Characterization consists of walk-through observations within the study area supplemented by existing data obtained from local, state, and federal agencies as well as maps and aerial photography. In general, the study area is limited to the Tonolli Corporation Site and a 0.5 mile radius around it for terrestrial and wetlands resources. However, the study area is extended to include 2.0 miles downstream of the site in the case of wetlands, riparian, and aquatic resources associated with Nesquehoning Creek.

The Ecological Characterization provides the following ecological information:

- General surficial soil conditions;
- Plant cover types;
- Dominant vegetation species and diversity within each plant cover type;
- Typical wildlife habitats, uses, and prevalent species;
- Relative abundance, size, location, and interspersions of plant cover types;
- Location and nature of wetlands;
- General aquatic (stream, pond, etc.) habitat conditions;
- General characteristics of stream and pond fish and benthic macro-invertebrate communities;
- Location, size, and existing conditions of any areas of environmental stress that could be potentially induced by hazardous materials.

5.0 Methods

5.1 Terrestrial and Wetlands Habitat Characterizations

5.1.1 General

The terrestrial and wetland habitat characterizations were initiated by researching available reference materials in order to anticipate site conditions. References consulted include the USDA Soil Conservation Service (SCS) Carbon County Soil Survey, a large scale site topographic map, Nesquehoning and Tamaqua USGS and National Wetland Inventory Quadrangles, and aerial photography of the study area, including color infrared. Background information on the existing vegetation communities in the area and presence/absence of state and federal rare, threatened, and endangered plant species was obtained from the Pennsylvania Natural Diversity Inventory (PNDI).

The field survey was conducted in two phases. The first phase involved a study area familiarization and reconnaissance survey on 7 September 1990. A principal objective of this survey was to rough-map major plant community types within the prescribed study area (0.5 mile radius of the Tonolli site). This information was used in conjunction with the gathered reference materials described above to develop a strategy for ensuring coverage of all significant habitats in the second phase field survey. This second phase took place on 2 through 4 October 1990 and involved systematic field inspection of the various habitat types identified from the preliminary analysis.

The preliminary analysis had determined the terrestrial habitats to be generally stratified in conformance with the topography, which consists of parallel forested ridges and an intervening developed/disturbed valley, all oriented east/west. The potential location of more sensitive wetland habitats appeared to be restricted to water body fringes and stream corridors. The

field inspection strategy developed to address these observations is a combination of two approaches. First, all water body fringes and stream corridors were inspected by targeting major wetland areas identified in the preliminary analysis and walking random segments of the remaining waterway corridors. Then, a series of transects was investigated to provide representative coverage of the remainder of the study area. Four transects, three east/west transects and one oriented north/south, were conducted as follows:

Transect EW-1 - 100 to 200 feet wide swath midway up south forested slope of Broad Mountain, on foot.

Transect EW-2 - 100 to 200 feet wide swath across north forested slope of Nesquehoning Mountain north of existing strip mine tailings, on foot.

Transect EW-3 - meander through center of valley, following existing public roads in a vehicle with occasional stops for habitats not previously characterized.

Transect NS-1 - 100 to 200 feet wide swath from top of south slope to top of north forested slope, on foot.

These transects are shown on Figure 5.1-1.

Transects EW-1 and EW-2 allowed sufficient investigation of the wooded slopes while also enabling the field crew to search for channels that might lead upslope or downslope to additional wetland areas. Transect EW-3 afforded the study team the best opportunity to locate any unusual habitat types in the developed valley area. The fourth transect, NS-1, was used to locate any additional significant habitat bands that are oriented east/west in accordance with the stratification pattern identified above such as power line right-of-ways and variations in woodland vegetation due to altitude that would not

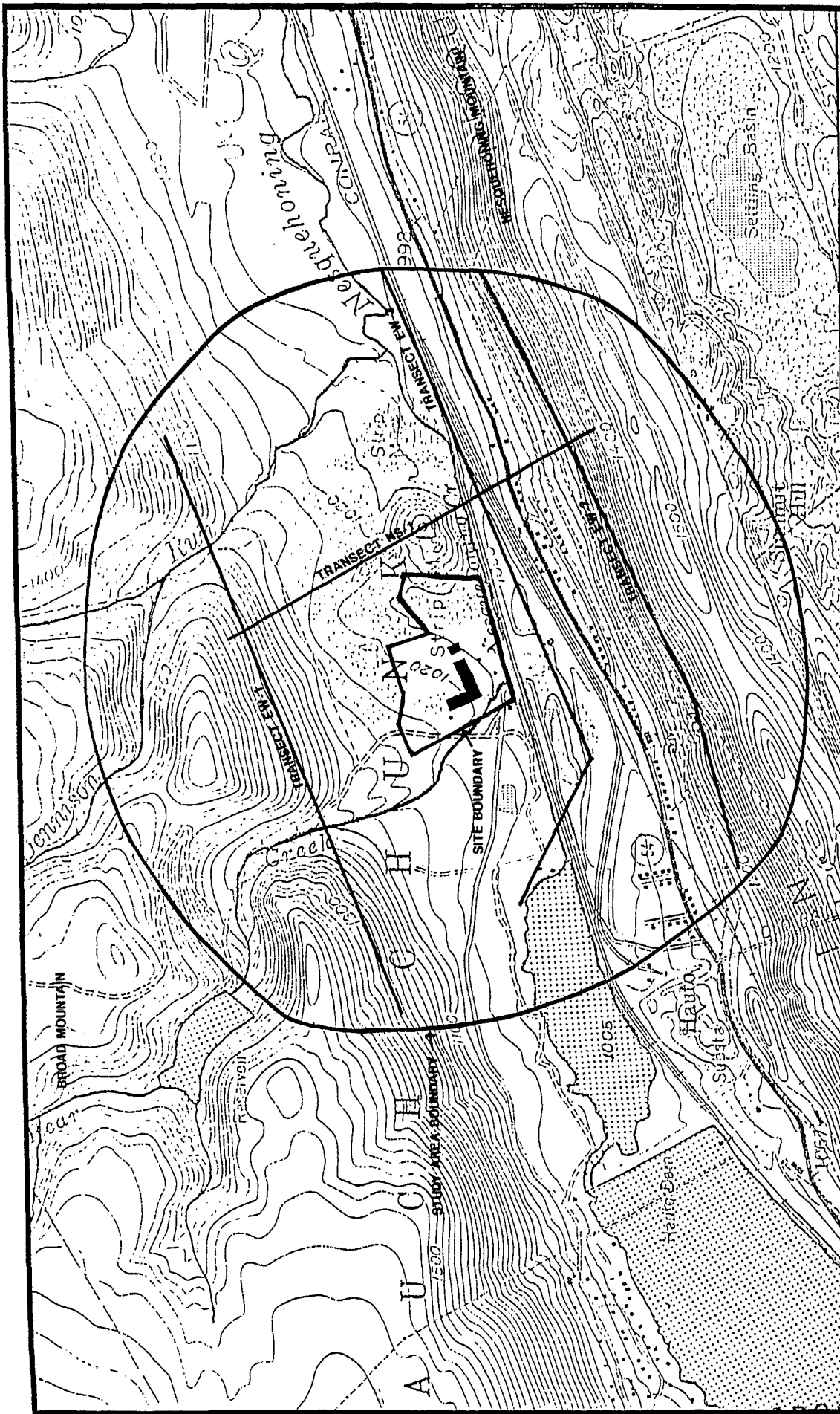


FIGURE 5.1-1. TERRESTRIAL/WETLANDS STUDY TRANSECT LOCATIONS

TONOLLI CORPORATION SITE

Source: USGS Tamaqua Quad, 1983

USGS Mesquitehoning Quad, 1976

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likely have been found along the other transects. The study team also characterized any unusual habitats observed by chance while pursuing the above-mentioned strategy. Exact location of transects were determined in the field based on accessibility and professional judgment. In addition, transect locations were biased towards covering as many habitats as possible.

The walking of stream corridors and transects was conducted by two biologists with substantial wetlands experience, one walking along each bank/floodplain or edge of the corridors/transects. A detailed inventory and evaluation of each vegetation community type was conducted following the vegetation assessment methodology described in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, "Intermediate-level On-site Determination Method". This procedure involves a systematic characterization of each plant community by assessing each vegetation layer within the community. Each different habitat encountered was described on a Federal Manual "intermediate level" data sheet. Spatially separate, but like habitats, on the same transect or corridor were documented on a Federal Manual "routine level" data sheet. Habitats suspected to be wetlands were subjected to the special identification criteria described in Section 5.1.2.

5.1.2 Special Criteria for Wetland Identification

Criteria for identifying a habitat as "wetlands" are defined in the delineation manual mentioned above developed jointly by the U.S. Army Corps of Engineers (COE), USEPA, USFWS, and SCS and dated January 1989. This identification methodology is also accepted by PA DER (PA Bulletin - Volume 19, Number 43, 28 October 1990). Wetlands were identified on the site following the methodology specified in the manual's "Intermediate-level On-site Determina-

tion Method". The use of this method was determined to be appropriate for the size and environmental characteristics of the study area.

The manual describes three "essential characteristics" which all wetlands have:

- (1) Hydrophytic Vegetation. The prevalent vegetation consists of macrophytic species growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. (These plants are specifically adapted to living in areas that are typically saturated for long periods of time.)
- (2) Hydric Soils. Soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions near the ground surface. (These soils stay saturated within the zone penetrated by the roots of surface plants (usually 6 to 18 inches in depth) long enough to develop characteristics that limit the type of vegetation that can grow in them.)
- (3) Wetland Hydrology. The area is inundated either permanently or periodically at mean water depths ≤ 6.6 feet, or the soil is saturated to the surface at least seasonally. (Standing water or a high water table must exist for at least 15 days during the growing season; standing water depth cannot exceed 6.6 feet.)

Vegetation data were interpreted using the USFWS's 1988 Pennsylvania plant list, supplemented by information from various vegetation identification keys for species not found on the regional list. The plant list categorizes species according to the following system:

Obligate(OBL). Always found in wetlands under natural (not planted) conditions (frequency greater than 99%), but may persist in nonwetlands if planted there by man or in wetlands that have been drained, filled, or otherwise transformed into nonwetlands.

Facultative Wetland (FACW). Usually found in wetlands (67%-99% frequency), but occasionally found in nonwetlands.

Facultative (FAC). Sometimes found in wetlands (34%-66% frequency), but also occurs in nonwetlands.

Facultative Upland (FACU). Seldom found in wetlands (1%-33% frequency) and usually occurs in nonwetlands.

Nonwetland (UPL). Occurs in wetlands in another region, but not found (<1% frequency) in wetlands in the region specified. If a species does not occur in wetlands in any region, it is not on the list.

Following categorization of the dominant species in a given assemblage, the assemblage as a whole was evaluated as to whether it can be characterized as a hydrophytic plant assemblage, and therefore possibly indicative of wetlands, taking into account that normal environmental conditions exist on the site.

Soils evaluation on this site was based on a detailed examination of color, mottling, texture, consistence, presence of roots, and other characteristics as specified in the Federal Manual (step 11 of the "Intermediate-level On-site Determination Method"). Munsell color charts were used to determine soil color. Hydrology was determined based on topographic position and the list of indicators from the Manual (step 12 of the "Intermediate-level On-site Determination Method"). The extent of each wetland identified on the site was estimated; delineation of jurisdictional limits is beyond the scope of this study.

5.2 Terrestrial and Wetland Fauna

A qualitative field survey of study area fauna was conducted simultaneously with the aquatic habitats and surface water survey, and wetlands and terrestrial habitats characterization survey. Effort was limited to casual observations made during these surveys. Species that could not be positively identified in the field were photographed when possible for later identification. The terrestrial/wetland fauna inventory was supplemented by contacting federal, state, and local wildlife agencies for existing data. Data also was solicited concerning rare, threatened, or endangered animal species that historically or presently use the site. Agencies contacted include Pennsylvania Fish Commission (PFC), Pennsylvania Game Commission (PGC), and United States Fish and Wildlife Service (USFWS).

5.3 Surface Water Resources

A field evaluation of the surface water biological resources in the vicinity of the Tonolli Site was conducted on 19 through 21 September 1990. The study area extends several miles upstream and downstream of the Tonolli Site (Figure 5.3-1). Thirteen sample stations were selected (Table 5.3-1). The physical habitat was described and samples of benthic macroinvertebrates and fish were collected at each station.

Three control stations (Nesquehoning Creek: NC-12, NC-13, and NC-14) are located in Nesquehoning Creek upstream of the Tonolli Site, and therefore, upstream of any potential influence. Four stations are located in Nesquehoning Creek downstream of the Tonolli Site (NC-15 through NC-18). These stations were selected to determine if any influence of the Tonolli Site could

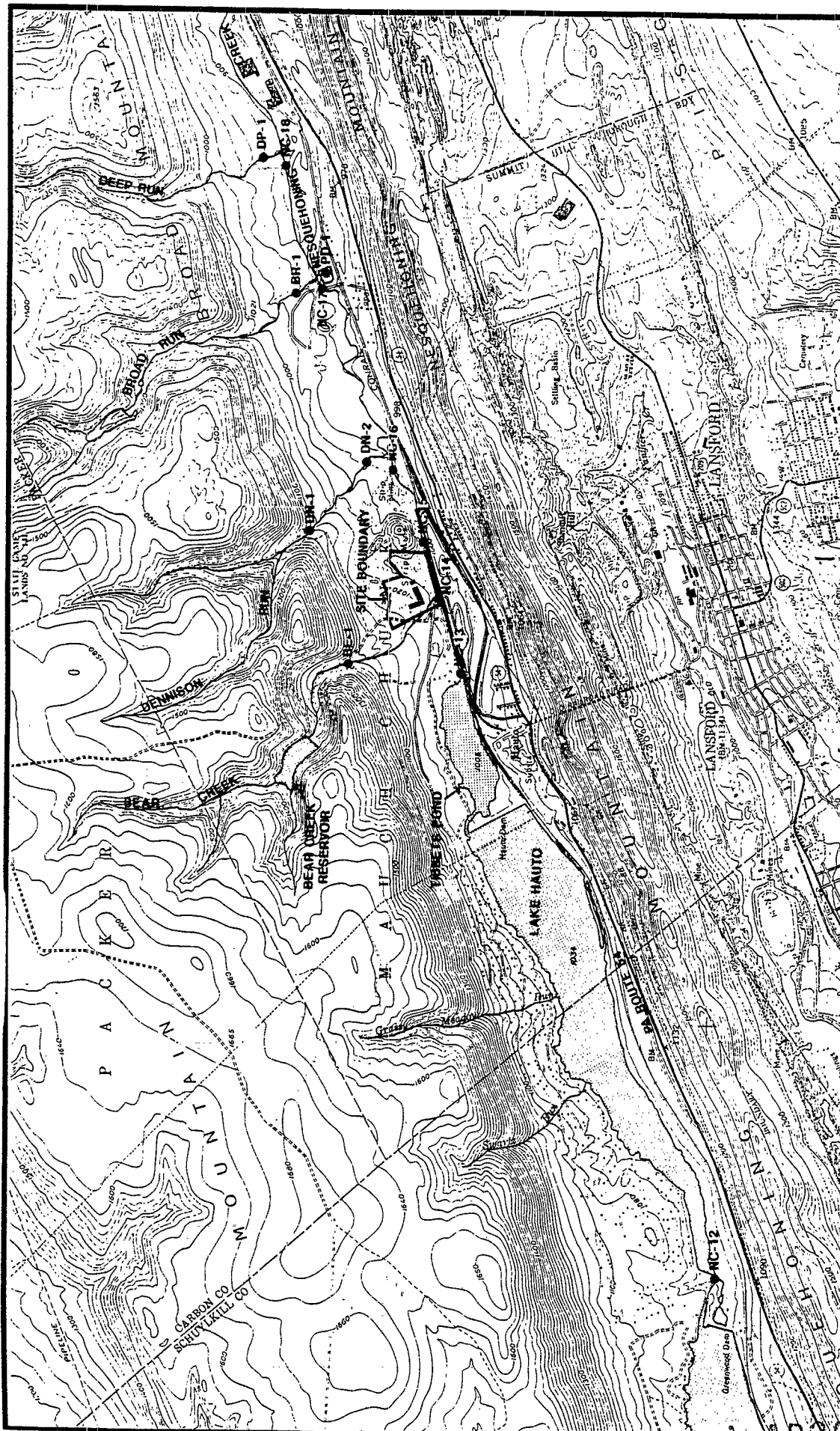
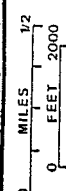


FIGURE 5.3-1 LOCATION OF SURFACE WATER RESOURCES SAMPLING STATIONS



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Table 5.3-1. Surface water sample station location information.

Stream/Station Number	Location
Nesquehoning Creek	
NC-12	Downstream of Greenwood Dam at a bridge just upstream of Lake Hauto.
NC-13	At a bridge immediately downstream of Tibbets Pond.
NC-14	At the bridge conveying the entrance road to the Tonolli Corporation Site. This point is upstream of the confluence of Bear Creek.
NC-15	Immediately downstream of the southeast corner of the Tonolli Corporation Site. This point is approximately 1,250 feet downstream of Station NC-14.
NC-16	Immediately upstream of confluence of Dennison Run.
NC-17	Immediately upstream of confluence of Broad Run.
NC-18	Immediately upstream of confluence of Deep Run.
Bear Run	
BE-1	Approximately 2,000 feet upstream of the western boundary of the Tonolli Corporation Site.
Dennison Run	
DN-1	Approximately 2,500 feet upstream of confluence with Nesquehoning Creek.
DN-2	Immediately upstream of confluence with Nesquehoning Creek.
Broad Run	
BR-1	Immediately upstream of confluence with Nesquehoning Creek.
Deep Run	
DP-1	Immediately upstream of confluence with Nesquehoning Creek.

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be detected. It is important to note that the sample stations established by Paul C. Rizzo Associates, Inc. for water and sediment quality sampling in Nesquehoning Creek overlap this study's biological sampling stations in only one instance (Water and Sediment Sampling Station NC-3 = Biological Sampling Station NC-14).

Five stations were established in tributaries of Nesquehoning Creek (Bear Creek: BE-1; Dennison Run: DN-1 and DN-2; Broad Run: BR-1; and Deep Run: DP-1). These stations were selected to determine the condition of aquatic resources in perennial streams contributing to Nesquehoning Creek. In addition, one station was established in an unnamed small pond (PD-1) located near the mouth of Broad Run. This pond is recharged via pipe from Broad Run, not from Nesquehoning Creek. This station was selected due to its proximity to the Tonolli Site and its potential as a recreational fishery.

5.3.1 Habitat Assessment

Habitat availability is a major determinant of aquatic community structure. The quality and quantity of habitat directly affects the structure and composition of resident biological communities, and habitat availability is directly affected by instream and surrounding topographical features. Habitat assessment can be useful in determining whether observed differences between biological communities are the result of stress or due to variations in available habitat.

The habitat assessment performed at each sampling station is adapted from the USEPA document entitled Rapid Bioassessment Protocols for Use In Streams and Rivers - Benthic Macroinvertebrates and Fish (EPA/444/4-89/001). The assessment includes quantification of nine physical habitat parameters. The parameters are designated primary, secondary, or tertiary depending upon

their relative contribution to habitat quality, and points are awarded accordingly. The more points awarded to a station, the better the habitat quality is within that station. The resulting values can be used to categorize habitat quality as excellent (100 to 135 points), good (64 to 99 points), fair (36 to 63 points), and poor (0 to 35 points). These categorizations also can be used to determine the level of comparability among sample stations.

Primary parameters characterize the various micro-habitats available within a station. These parameters are 1) bottom substrate and available cover, 2) substrate embeddedness, and 3) micro-habitat availability. A station may receive a maximum of 20 points per parameter for excellent primary parameter characteristics. These parameters evaluate the amount of stable substrate available for colonization and cover, asking such questions as: Is the substrate deeply embedded or is room available for macroinvertebrates to live under rocks and rubble and within cracks? How many different types of micro-habitat are available for colonization by different types of fish and macroinvertebrates? These parameters are considered to be highly correlated with complexity in aquatic communities present within a particular stream reach.

Secondary parameters describe stream channel morphology and evaluate the presence of channel alteration. The parameters are 1) channel alteration, 2) bottom scouring and deposition, and 3) macro-habitat quality. A station can be awarded up to 15 points per parameter for excellent secondary parameter characteristics. These parameters evaluate the amount and frequency of erosion events; how these events affect the bottom substrate, and the presence and extent of macro habitat available for colonization. These parameters are considered important, but are less highly correlated than primary parameters to complexity of aquatic communities present within a particular stream reach.

Tertiary parameters describe riparian and bank structure, and have the lowest potential for affecting the structure of the aquatic community. The parameters are 1) bank stability, 2) bank vegetative stability, and 3) stream side cover. A station can be awarded a maximum of 10 points per parameter for excellent tertiary parameter characteristics. These parameters measure the stability of the upper banks: Does erosion extend beyond the stream bottom to the banks? If erosion is affecting the stream banks, how stable is the existing vegetation? Is the bank capable of withstanding flood events, or is bank failure and soil loss a common factor? Is there vegetative cover capable of providing shade to moderate diurnal (day/night) temperature variation and to minimize the resulting dissolved oxygen fluctuations? These characteristics are considered important, but are the least highly correlated of those measured regarding complexity of aquatic communities present within a particular stream reach.

In addition to evaluation of the physical habitat present, field measurements of several general water quality parameters were made. These parameters (dissolved oxygen, pH, conductivity, and temperature) are very important biologically and can act as indicators of water quality problems. Dissolved oxygen and temperature measurements were made with a Yellow Springs Instrument Model 57 D.O. meter. Measurement of pH was made with an Analytical Measurements Big Scale meter. Conductivity measurements were made with a Yellow Springs Instrument Model 33 conductivity meter. Field calibration was performed on all meters prior to use.

5.3.2 Macroinvertebrate Community

The benthic macroinvertebrate community present at each station was evaluated through the use of data obtained in qualitative samples. These data were analyzed and compared with a variety of descriptive statistical methods.

A single qualitative sample was collected at each sample station using an 850 micron mesh D-frame kick net. Each sample consisted of a composite of nine twenty-second kick replicates collected from all habitat types present within a station. Each replicate was obtained by placing the net on the stream bottom, vigorously disturbing the substrate to approximately 1 1/2 feet upstream of the net by kicking, and allowing the current to wash dislodged organisms and substrate material into the net. The material collected by each replicate was placed into the sample container prior to collection of subsequent replicates to avoid clogging of the mesh. Flow was simulated in areas of low flow by passing the net through the water column directly above the disturbed area. A consistent collection effort was expended at all stations to obtain samples representative of the macroinvertebrate communities present.

Samples were preserved in the field with 70 percent isopropanol and transported to RMC's Pottstown Ecological Laboratory for sorting, identification, and enumeration. During sorting, the samples were subsampled using a procedure whereby each sample was divided into eighths using a Folsom Sample Splitter. Three randomly selected eighths were sorted with the relative abundance of each taxon estimated as follows: rare (1 to 3 specimens), present (4 to 10 specimens), common (11 to 30 specimens), abundant (31 to 100 specimens), and super abundant (more than 100 specimens). In addition, the other five eighths were sorted only for taxa not observed in the previously selected and more intensively sorted three eighths. The relative abundance of these taxa was estimated using the same system as above. In all cases, sufficient specimens were removed from the samples for accurate identification. Macroinvertebrates were identified to genus, or the lowest taxon practicable, with the use of a dissection microscope. Principal keys used for identifica-

tion were those published in Peckarsky (1989), Merritt and Cummins (1984), Pennak (1989), and Klemm (1985).

Sample results were evaluated using a variety of parameters designed to describe macroinvertebrate communities. These parameters are: total number of taxa, number of taxa sensitive to environmental stress, relative abundance, and EPT/Chironomidae ratio.

The total number of taxa observed in a sample provides an estimation of the species richness of the benthic community sampled. The number of pollution sensitive taxa (EPT) is determined by totaling taxa within the mayfly (Ephemeroptera), stonefly (Plecoptera), and caddisfly (Trichoptera) insect orders. Taxa within these groups are considered intolerant of most forms of pollution and often are poorly represented in samples from stressed environments. Conversely, the dipteran family Chironomidae is considered generally tolerant of environmental stress. Comparing the relative abundance of sensitive taxa with the relative abundance of tolerant (Chironomidae) taxa provides an estimate of the balance between a sample's sensitive and tolerant organisms. This estimate is referred to as the EPT/Chironomidae ratio. These parameters are selected from Rapid Bioassessment Protocols for Use in Streams and Rivers - Benthic Macroinvertebrates and Fish (EPA/444/4-89/001).

5.3.3 Fish Community

Fish collections were made at each stream station by electrofishing with a 110 volt AC generator. Approximately 200 feet of stream were electrofished. Stunned fish were netted and placed in a live well. Captured fish were identified and counted. Reference specimens were retained for identification and verification purposes. In the pond (PD-1), the fish community was evaluated

by sampling the shoreline community with the electrofishing equipment and seining with a 100 x 6 foot bag seine (mesh = 1/4 inch) in deeper water.

The fish data were evaluated using a variety of parameters designed to describe fish communities. These parameters are: total number of species, number of game fish species, and sensitive and intermediately sensitive species quality points as described below.

The total number of species in a sample gives an estimation of the species richness of the fish community under examination. The number of game fish species present at a station provides an indication of the recreational potential of that station.

The environmental stress tolerance of each species was determined from Appendix D of the USEPA document entitled Rapid Bioassessment Protocols for Use in Streams and Rivers - Benthic Macroinvertebrates and Fish (EPA/444/4-89/001). Sensitive species were awarded one quality point. Species considered intermediately sensitive were awarded one-half quality point. Species considered tolerant of environmental stress were awarded no points. Quality points were totaled by station and the result was used to evaluate the relative sensitivity of the fish community, and the balance between sensitive and tolerant species.

6.0 Findings

6.1 Physical Characteristics

6.1.1 Physiography, Topography, and Land Use

The Tonolli Corporation Site study area is located in the gently to very steeply sloping terrain of the Mahoning Valley in the Appalachian Valley and Ridge physiographic province. Study area topography consists of the east to west oriented valley floor in the center, Broad Mountain to the north, and Nesquehoning Mountain to the south. The valley averages approximately one-half mile in width and slopes gradually upgradient from Nesquehoning Creek to the bases of Broad Mountain and Nesquehoning Mountain. Net relief is approximately 120 feet for the valley floor from the base of Broad Mountain to Nesquehoning Creek and approximately 600 feet for the entire study area (Figure 6.1-1).

Study area land uses as shown on an 8 May 1981 infrared aerial photograph (Figure 6.1-2) are comprised largely of undeveloped forest, coal spoil stockpile areas, and industrial and residential properties. A review of Carbon County Planning Commission 1989 aerial photography revealed that the land use patterns remain the same and adjacent land uses are similar in nature. The centrally located Tonolli Corporation property is the principal study area landmark. Other prominent study area landmarks include large coal spoil stockpile areas to the east and south of the Tonolli Site, Tibbets Pond which straddles the central western study area boundary, and the village of Hauto which runs west to east through the lower half of the study area.

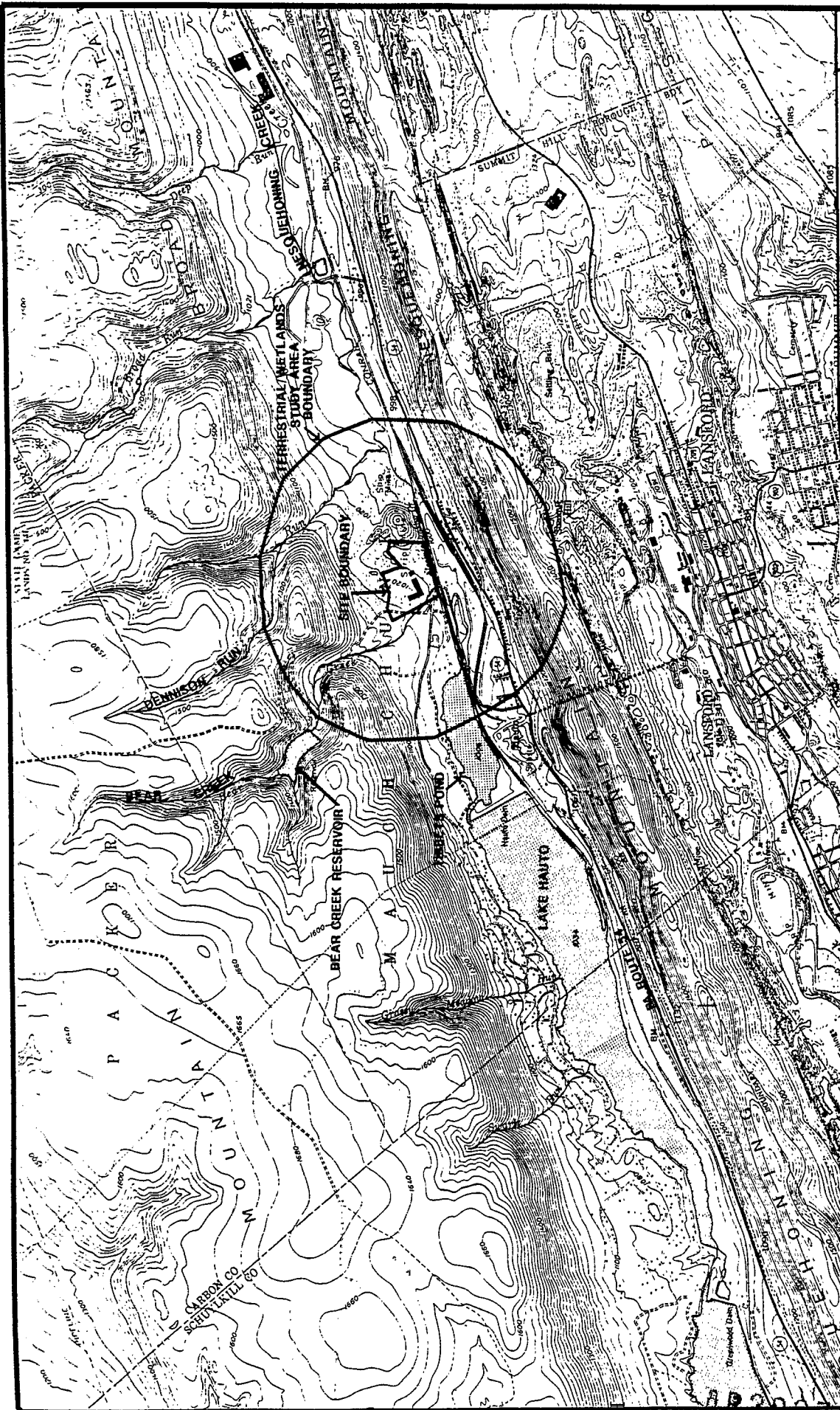


FIGURE 6.1-1. PHYSICAL FEATURES MAP
 TONOLLI CORPORATION SITE
 Source: USGS Tamaqua Quad, 1983
 USGS Nesquehoning Quad, 1976

0 1/2
 MILES
 0 1 2
 FEET 2000

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FIGURE 6.1-2 INFRARED AERIAL PHOTOGRAPHY 5/8/1981
TONOLLI CORPORATION SITE
Source: EPA Interim Report, March 1990

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SCALE: 1" = 1425'

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6.1.2 Climate

The Carbon County Soil Survey describes the climate of the region as a temperate modified mountain climate. The valley and ridge physiography of the area strongly influences the distribution of precipitation, temperature range and patterns of air flow. Storms tend to be deflected by the mountain ridges and channeled up the valleys. The climate is generally characterized by abundant and seasonally well distributed precipitation which averages 50 inches per year. However, periods of low rainfall are not uncommon in the late summer and fall and there can be a wide geographic distribution and a wide fluctuation of precipitation in any year. Average yearly temperature is 50 F and average temperature during the growing season is 65 F. Mountainous areas have a lower average temperature in comparison to the valleys.

6.1.3 Drainage

The study area lies entirely within the drainage basin of Nesquehoning Creek and is generally well drained. Nesquehoning Creek is a perennial stream which originates on the slopes of Broad Mountain approximately four miles west of the study area. After passing through a series of impoundments, including Tibbets Pond, the stream flows west to east through the center of the study area and passes adjacent to the southern boundary of the Tonolli Corporation Site. Nesquehoning Creek receives drainage from Bear Creek and Dennison Run which are two perennial tributaries flowing southeast from Broad Mountain. Bear Creek flows under the southwest corner of the Tonolli Corporation Site via a culvert to its confluence with Nesquehoning Creek. Dennison Run is confluent with Nesquehoning Creek near the eastern terrestrial and wetlands study area boundary.

The PA DER Chapter 93 Water Quality Standards designate Nesquehoning Creek as a Cold Water Fishery (CWF), and Bear Creek and Dennison Run as High Quality - Cold Water Fisheries (HQ-CWF). The cold water fishery classification designates a stream or watershed which provides for the maintenance and/or propagation of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat. The high quality waters classification designates a stream or watershed which has excellent quality waters and environmental or other features that require special water quality protection.

All three streams maintained a steady flow during the study period. The Nesquehoning Creek has a well entrenched channel and ranges from 20 to 30 feet in width. The stream appears to have been channelized through most of the study area except near the eastern study area boundary. Nesquehoning Creek is characterized by a riffle/run flow pattern and its depth ranged from a few inches to approximately one-foot during the field study. The streambed substrate west (upstream) of the Tonolli Corporation Site is composed of sand, gravel, and cobbles; however, east (downstream) of the Tonolli Site large quantities of coal fines have been washed into the stream and have settled out into the substrate.

The lower sections of Bear Creek and Dennison Run are very similar and generally have a sinuous riffle/run/pool flow pattern that is characteristic of higher gradient mountain streams; however, in some areas the streams flow through small braided channels. The streams range from approximately two to seven feet in width and maintained a flow of a few inches to approximately one-foot in depth during the field study. The streams have substrates composed primarily of a mix of cobbles, gravel, and sand. The upper sections of the streams are very dissimilar. The upper section of Bear Creek has been

channelized up to Bear Creek Reservoir. A large section of the upper part of Dennison Run has no channel and flows underneath the ground surface through a large boulder field.

6.1.4 Geology and Soils

The valley and ridge physiography of the study area was formed by structural deformation and folding of the underlying bedrock during the Paleozoic Epic. The study area bedrock is underlain by the Mauch Chunk, Pocono, Catskill, Pottsville, and alluvial Formations. The Mahoning Valley floor is composed of the alluvium and the Mauch Chunk Formations. The alluvium is deposited in a band averaging a quarter mile wide and runs roughly through the center of the valley in association with Nesquehoning Creek. The alluvium consists of unconsolidated rock material deposited by the Nesquehoning Creek and its tributaries. The remainder of the valley floor between the alluvial formation and the bases of Broad Mountain and Nesquehoning Mountain is underlain by the Mauch Chunk Formation. This formation consists of red lumpy shale, sandstone, and siltstone.

The Pocono and Catskill Formations underlie Broad Mountain. The Pocono Formation underlies the lower section of the mountain slope and consists of hard gray sandstone with some conglomerate and shale. The Catskill Formation underlies the remainder of the mountain to its summit and is composed of red, green, and gray siltstone, sandstone, and shale with a few conglomerate rocks. Nesquehoning Mountain is underlain by the Pottsville Formation which consists mainly of coarse conglomerate and hard sandstone.

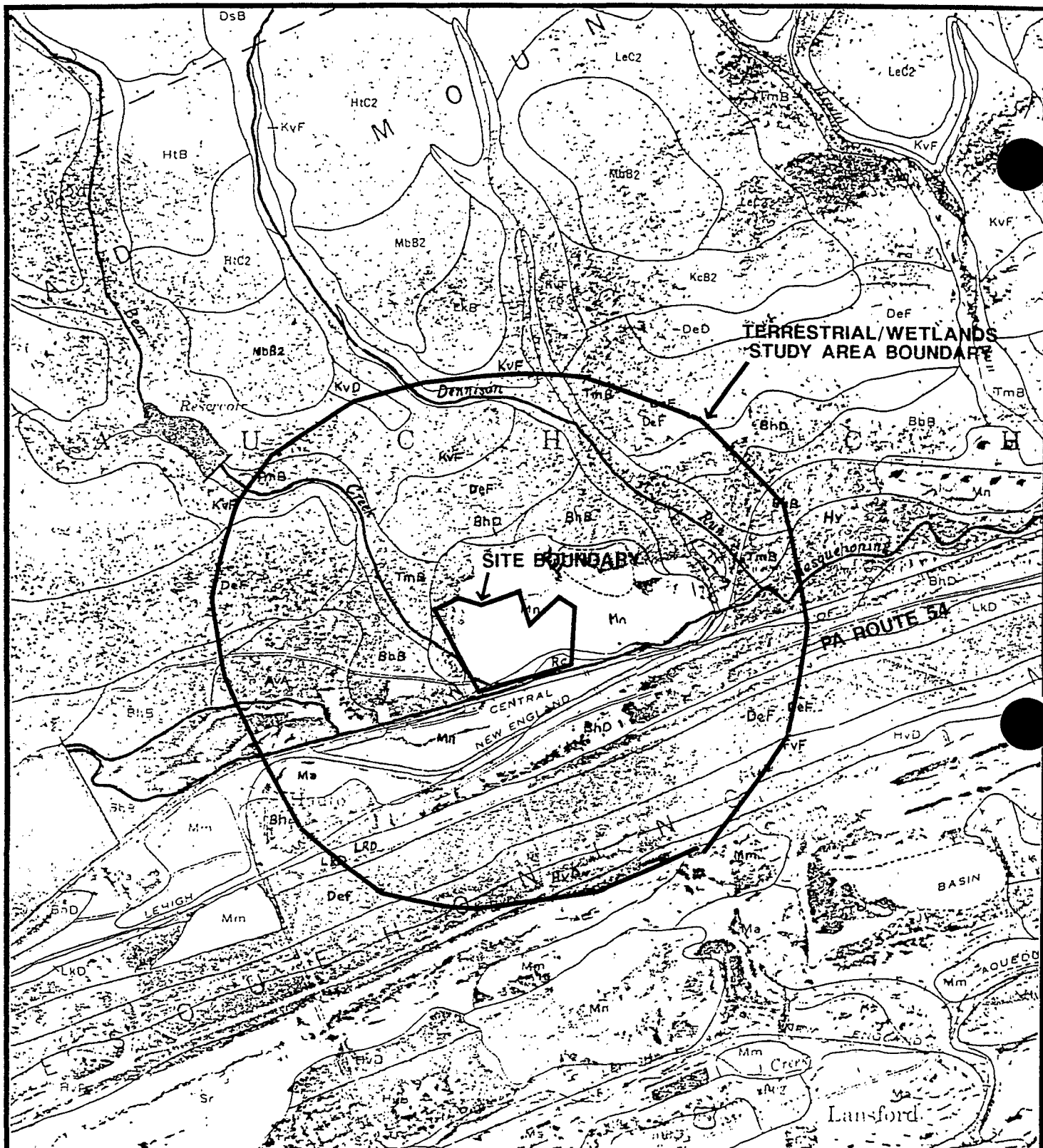
The Carbon County SCS Survey shows the following soils to occur in the study area:

Symbol	Name	Drainage Class
Ava	*Andover very stony loam	Poorly-drained
BhB, BhD	Buchanan very stony loam	Moderately well-drained to somewhat poorly-drained
DeD, DeF	Dekalb very stony loam	Well-drained
FvF	Fleetwood very stony loam	Well-drained
HvD	Hazelton very stony loam	Well-drained
Hy	*Holly silt loam	Poorly-drained to somewhat poorly-drained
KvD, KvF	Klinesville very stony silt loam	Well-drained
LkD	Leck Kill	Well-drained
Ma	Made land	Not classified
Mn	Mine dumps	Not classified
Rc	Riverwash, coal	Not classified
Sr	Strip mines	Not classified
Tf	Tioga fine sandy loam	Well-drained
TmB	Tioga and Middlebury very stony loams	Well-drained to moderately well-drained

*Listed as a hydric soil in "Hydric Soils of the State of Pennsylvania, 1985."

The county soil survey classifies the soils of the Mahoning Valley floor as belonging to the Laidig-Buchanan association. The soil survey describes these soils as originating from colluvium along the bases of steep mountains. The soils on the slopes of Broad Mountain and Nesquehoning Mountain are classified by the SCS as belonging to the Dekalb-Hazelton steep soils association. The soil survey describes these soils as steep stony soils derived from frost-worked gray sandstone and deep glacial till. These soils are shown in Figure 6.1-3.

The slopes of Broad and Nesquehoning Mountains are almost entirely mapped as well-drained soil. In contrast, the valley floor is mapped largely as mine dumps, made land, and hydric soil, except for several areas of moderately to somewhat poorly drained Buchanan soil. Most of the Tonolli Corporation Site is included in the area mapped as mine dumps. The hydric soil areas



SEE SECTION 6.1 FOR NAMES OF MAPPING UNIT CODES



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FIGURE 6.1-3. SCS SOIL SURVEY MAP
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Source: SCS Carbon County Soil Survey, 1962

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consist of Andover very stony loam mapped north and east of Tibbets Pond and Holly silt loam mapped in association with Nesquehoning Creek near the eastern study area boundary. Hydric soils are formed by prolonged saturation by groundwater and/or surface water and comprise one of the three parameters necessary for identifying wetlands under the methodology presented in the Federal Manual for Identifying and Delineating Wetlands (see Section 5.1.2 - Special Criteria for Wetland Identification). The presence of hydric soils potentially indicates the presence of wetlands.

6.2 Vegetation Communities

The Tonolli Corporation Site study area is vegetated largely by deciduous forest, scrub/shrub, mixed scrub/shrub-herbaceous, herbaceous, and floating aquatic macrophytic plant communities (Figure 6.2-1). The deciduous forest is located primarily on the slopes of Nesquehoning Mountain and Broad Mountain while the other communities are spread out across the Nesquehoning Valley floor. The majority of these communities can be classified as non-wetland preferring; however, some wetland-preferring communities are associated with Tibbets Pond, Bear Creek, Dennison Run, Nesquehoning Creek and occur as isolated pockets in the mine spoil areas. The National Wetland Inventory (NWI) quadrangles for the study area show one forested wetland community (PFO1A) associated with Nesquehoning Creek near the eastern study area boundary and ponded water (POWZh and POWZx) lying in several depressions scattered across the mine spoil areas (Figure 6.2-2). Tibbets Pond is the only NWI mapped deepwater habitat (maximum depth greater than two meters) within the study area and is classified as an open-water lake (L10WHh).

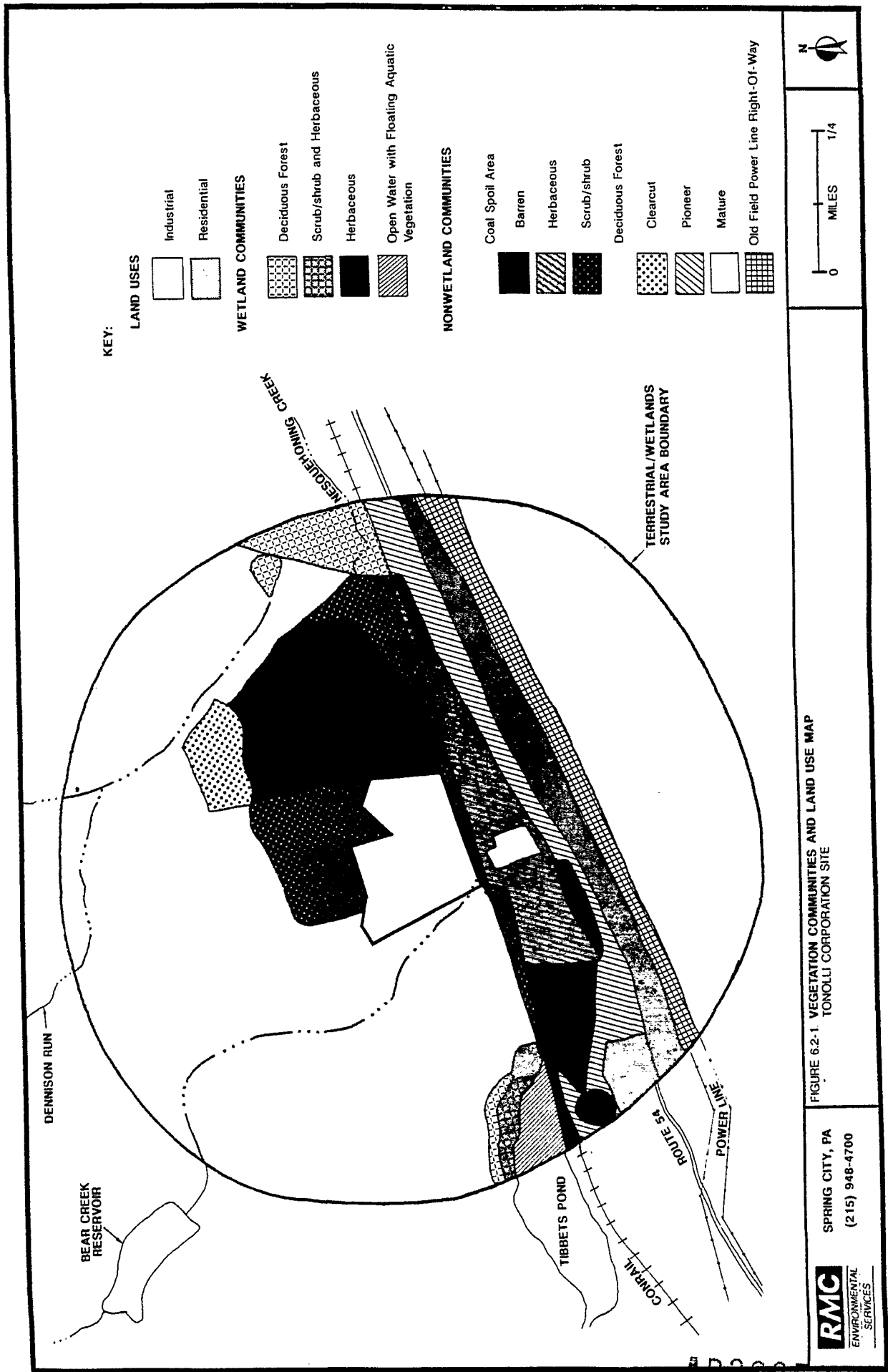
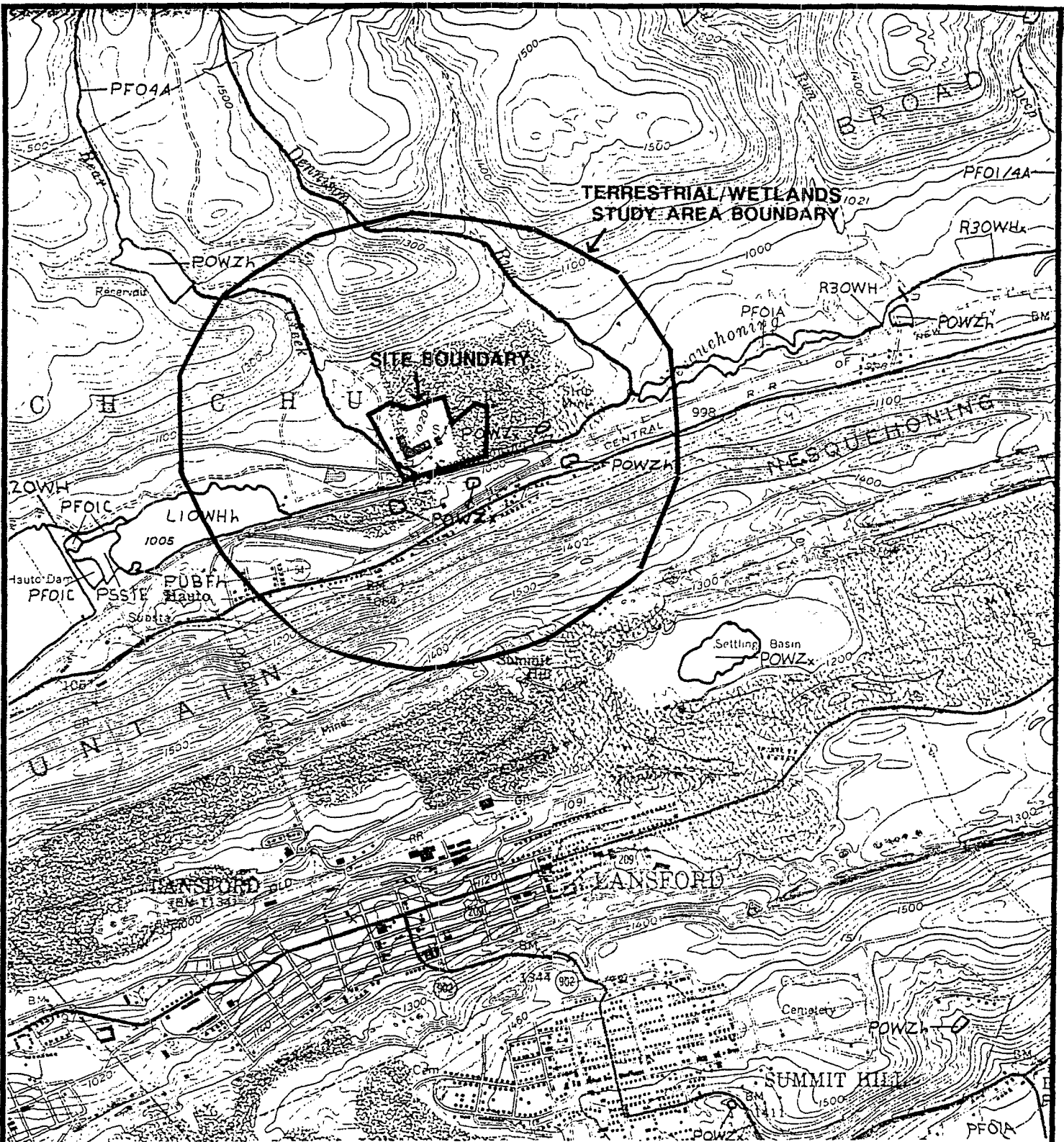


FIGURE 6.2-1. VEGETATION COMMUNITIES AND LAND USE MAP
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KEY:

- L10WHh - Lacustrine, limnetic, open water/unknown bottom, permanently flooded, diked/impounded
- PFO1A - Palustrine, forested, broad-leaved deciduous, temporarily flooded
- POWZk - Palustrine, open water/unknown bottom, intermittently exposed/permanently flooded, diked/impounded
- POWZx - Palustrine, open water/unknown bottom, intermittently exposed/permanently flooded, excavated



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FIGURE 6.2-NATIONAL WETLANDS INVENTORY MAP
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Source: USFWS NWI Tamaqua Quad, 1981

USFWS NWI Nesquehoning Quad, 1981

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6.2.1 Mesic Forests

Deciduous forest covers the largest portion of the study area and consists of a relatively mature mesic second growth community, a mesic pioneer community, and relatively mature second growth wetland forest. The relatively mature mesic forest community vegetates most of the slopes of Broad Mountain and Nesquehoning Mountain, and most of the study area between Tibbets Pond and the Tonolli Corporation Site. The composition of these forest communities is similar throughout the study area with only minor variation in dominant species from place to place. On Broad Mountain the overstory consists largely of chestnut oak (Quercus prinus, UPL), sweet birch (Betula lenta, FACU), white oak (Quercus alba, FACU), northern red oak (Quercus rubra, FACU-), and red maple (Acer rubrum, FAC). The understory is very dense in some areas and is dominated by mountain laurel (Kalmia latifolia, FACU), lowbush blueberry (Vaccinium angustifolium, FACU-), highbush blueberry (Vaccinium corymbosum, FACW), black tupelo (Nyssa sylvatica, FAC) and sassafras (Sassafras albidum, FACU). The groundcover was generally very sparse throughout the community and comprised primarily of teaberry (Gaultheria procumbens, FACU), hayscented fern (Dennstaedtia punctilobula, UPL), and ground pine (Lycopodium tristachyum, UPL).

On the steeply-sided slopes adjacent to Bear Creek and Dennison Run the deciduous forest undergoes a transition to a community with an overstory dominated by eastern hemlock (Tsuga canadensis, FACU) and an understory composed largely of great rhododendron (Rhododendron maximum, FAC). Due to the very dense combination of canopy and understory cover (approximately 90 percent) the groundcover is extremely sparse and consists of moss and a few scattered specimens of wild sarsaparilla (Aralia nudicaulis, FACU).

On Nesquehoning Mountain only northern red oak, chestnut oak, and sweet birch are predominant in the overstory. The understory is composed primarily of mountain laurel, lowbush blueberry, witch hazel (Hamamelis virginiana, FAC-), and saplings of sweet birch and striped maple (Acer pensylvanicum, FACU). Highbush blueberry, black tupelo, and sassafras do not occur as dominant species as on Broad Mountain. The groundcover includes wild sarsaparilla, bracken fern (Pteridium aquilinum, UPL), and marginal wood fern (Dryopteris marginalis, FACU-) as dominant species, in addition to teaberry and hayscented fern.

A large section of the deciduous forest community northeast of the Tonolli Corporation site was clear cut in preparation for the construction of a waste coal fired electric cogeneration station. Other than in this area there was no other evidence of logging activity. The only other disturbance noted to the forested areas was moderate gypsy moth defoliation of the canopy throughout the study area resulting in an average canopy coverage of approximately 50 percent, despite the relatively mature state of the forest.

A pioneer deciduous forest vegetates a narrow band running west to east between the coal spoil area and residential areas in the village of Hauto. The community is vegetated by species characteristic of or commonly found in disturbed areas. The overstory is comprised of quaking aspen (Populus tremula, FACU) and gray birch (Betula populifolia, FAC). The dense understory consists of steeplesbush (Spirea tomentosa, FACW) and gray birch saplings. The groundcover is very sparse due to the dense understory and disturbed soils, consisting largely of moss and a few specimens of wrinkle-leaved goldenrod (Solidago rugosa, FAC).

6.2.2 Wetland Forests

Forested wetlands are located throughout the study area in association with the major streams and water bodies and generally can be classified as relatively mature. The largest wetland forest community is located adjacent to the central-eastern study area boundary in an area mapped by the SCS as Holly silt loam, a listed hydric soil. This area is part of a much larger wetland forest community extending east of the study area along Nesquehoning Creek and is characterized by dense stands of great rhododendron in the understory. The overstory is predominantly red maple and the understory is dominated by sheep-laurel (Kalmia angustifolia, FAC), highbush blueberry, and black tupelo saplings in addition to great rhododendron. The sparse groundcover largely consists of cinnamon fern (Osmunda cinnamomea, FACW), soft rush (Juncus effusus, FACW+), sedges (Carex spp., FACU-OBL), and ground pine. The presence of hydric soil and wetland hydrology was confirmed during the field survey. The typical soil matrix color at 10 to 12 inches in depth is light gray (10 YR 7/1) with mottling, indicating hydric soil conditions. Hydrologic features characteristic of wetlands consist of numerous small groundwater seeps, soil saturated to the surface, inundation at depths of up to one inch, water-stained leaves, surface water scoured areas, and braided drainage patterns.

An approximately 200 foot wide band of forested wetlands fringes Tibbets Pond. The overstory consists mainly of red maple and the understory is comprised largely of highbush blueberry, black tupelo saplings and greenbrier (Smilax roundifolia, FAC). The groundcover is dominated by cinnamon fern and Sphagnum moss (Sphagnum spp, OBL). The hydric soil and wetland hydrology parameters were noted during the field survey. The soil is mapped as Andover silt loam and has a typical matrix color of light gray (10 YR 7/1) with mot-

tling at 10 to 12 inches in depth, indicating hydric soil conditions. Wetland hydrology indicators observed in this community during the field study were a water table at or near the soil surface, soil saturated to the surface, and buttressed tree trunks.

Bear Creek has a number of small forested wetlands of similar character contiguous to it along its lower section that are too small to map on Figure 6.2-1, but warrant inclusion in the inventory. Typically the width of the stream/wetland corridor does not exceed 25 feet. These wetlands have an overstory dominated by variable mixture of red maple, swamp white oak (Quercus bicolor, FACW+), and eastern hemlock. The understory consists largely of common greenbrier (Smilax rotundifolia, FAC) and generally dense stands of great rhododendron. Hayscented fern, cinnamon fern, and New York fern (Thelypteris noveboracensis, FAC) predominate in the understory.

Dennison Run has more extensive areas of forested wetlands associated with it, particularly in the middle and upper sections although they, too, are not large enough to show on Figure 6.2-1. The forested wetlands in the lower section are smaller in size and have an overstory comprised largely of eastern hemlock and red maple. The understory is dominated by a variable mixture of great rhododendron, highbush blueberry, arrow-wood (Viburnum dentatum, FAC), witch-hazel, and saplings of black tupelo and red maple. The groundcover is composed mostly of a variable mixture of wrinkle-leaved goldenrod, cinnamon fern, mountain aster (Aster divaricatus, UPL), arrow-leaved tearthumb (Polygonum sagittatum, OBL), burreed (Sparganium spp., OBL), sedges, monkey flower (Mimulus ringens, OBL), bugleweed (Lycopus spp., OBL), and sphagnum moss (Sphagnum spp., OBL).

In the middle section the stream generally runs beneath a large boulder field and does not have a defined channel. In this area the wetland is char-

acterized by an overstory dominated by eastern hemlock and an understory consisting of dense stands of rhododendron and thickets of catbrier. The ground-cover is composed largely of Sphagnum moss. Spot checks of the upper reaches of Dennison Run revealed a defined channel associated with a very similar wetland vegetation community.

Tioga and Middlebury very stony loam soil is mapped adjacent to Bear Creek for its entire length and all but the downstream end of Dennison Run. This soil is not listed as hydric; however, the county soil survey states that it can contain poorly drained areas which would be too small to map. The soil adjacent to Dennison Run near its confluence with Nesquehoning Creek is mapped as Holly silt loam, a listed hydric soil, which was consistent with the findings of the field survey. Field observations confirmed the presence of hydric soils and wetland hydrology. Soil borings made in representative areas of Tioga-Middlebury soil along both streams revealed typical matrix colors of very dark gray (5 YR 3/1), dark gray (5 YR 4/1) and (10 YR 4/1), and grayish brown (2.5 YR 5/2) with mottling at 10 to 12 inches in depth, indicating hydric soil conditions. As described previously the typical Holly silt loam soil matrix color is light gray (10 YR 7/1) with mottling at 10 to 12 inches in depth, indicating hydric soil conditions. The presence of wetland hydrology was indicated during the field survey by soil saturated to the surface, a water table at or near the surface, and in some areas surface inundation of up to one-inch in depth.

6.2.3 Mesic and Wetland Scrub/shrub Communities

Scrub/shrub and scrub/shrub-herbaceous communities are located in several areas across the valley floor. Mesic scrub/shrub communities vegetate the banks of the Nesquehoning Creek for much of its length within the study

area and large areas of mounded mine spoil north and east of the Tonolli Corporation site. This vegetation community is composed of pioneer species (plants characteristically found in disturbed areas). The community is overwhelmingly dominated by gray birch with lesser amounts of quaking aspen, jack pine (Pinus banksiana, FACU), and little bluestem (Schizachyrium scoparium, FACU-).

A palustrine scrub/shrub - herbaceous wetland community is located along the northern side of Tibbets Pond. The scrub/shrub layer consists entirely of buttonbush (Cephalanthus occidentalis, OBL) and smooth alder (Alnus serrulata, OBL). The herbaceous layer is dominated by sedges and red top grass (Argostis alba, FACW). Confirmation of the hydric soil and wetland hydrology parameters revealed that they were similar to those found in the adjacent wetland forest community. The SCS mapped Andover very stony silt loam has a typical matrix color of light gray (10 YR 7/1) with mottling at 10 to 12 inches in depth, indicating hydric soil conditions. The presence of wetland hydrology is indicated by a water table at the soil surface and herbaceous vegetation growing on tussocks.

6.2.4 Mesic and Wetland Herbaceous Communities

The remainder of the study area is vegetated by wetland and nonwetland herbaceous plant communities. Nonwetland herbaceous plant communities vegetate the power line right-of-way on Nesquehoning Mountain and most of the coal spoil area south of Nesquehoning Creek. Palustrine emergent (herbaceous) wetland communities are located in topographic depressions within the coal spoil area south of the Nesquehoning Creek and are associated with Bear Creek and Dennison Run.

The power line right-of-way is vegetated by species characteristic of disturbed areas, the vegetation is dominated by hayscented fern, but also includes scattered patches of Allegheny blackberry (Rubus allegheniensis, FACU-), sweet fern (Comptonia peregrinia, UPL), and sweet birch.

A sparse pioneer herbaceous vegetation community vegetates a large section of the coal spoil stockpile area south of the Nesquehoning Creek. The community largely consists of three-awn grass (Aristida dichotoma, UPL) and redtop grass.

A nonwetland herbaceous community is the only major vegetation community within the Tonolli Corporation Site boundaries. The remainder of the site has been developed and is largely devoid of vegetation. The lone vegetation community is located in a remediated waste lagoon. The community is dominated by Pennsylvania smartweed (Polygonum pensylvanicum, FACW) which is a wetland preferring plant species; however, it is commonly found in disturbed non-wetland areas. Hydric soil and wetland hydrology parameters were not observed, indicating that this community is not a wetland. The soil consists of fill and has a typical matrix color of dark brown (7.5 YR 4/2) at 10 to 12 inches in depth without mottles, indicating nonhydric soil conditions. Indicators of wetland hydrology were absent during the study period since the depth to saturated soil exceeded 12 inches.

Palustrine emergent wetlands are located in the western, central, and eastern sections of the coal spoil areas south of the Nesquehoning Creek and are associated with Bear Creek and Dennison Run. In the coal spoil area the emergent wetlands are located in topographic depressions in the coal fines where water was ponded at depths of up to four inches during the field survey. The vegetation is composed mostly of a variable mixture of common cattail (Typha latifolia, OBL), common reed (Phragmites australis, FACW), soft rush

(Juncus effusus, FACW+), sedges, woolgrass (Scirpus cyperinus, FACW+), and boneset (Eupatorium perfoliatum, OBL).

Bear Creek has one large and a number of small palustrine emergent wetlands associated with it. The largest area extends roughly 30 feet from the stream channel, which is too small to show on Figure 6.2-1. Plant species occurring as dominant in one or more of these wetlands are stilt grass (Eulalia viminea, FAC), deer-tongue witchgrass (Dichanthelium dichotomum, FAC+), shallow sedge (Carex lurida, OBL), unidentified sedges, New York fern, cinnamon fern, bugleweed, burreed, fowl mannagrass (Glyceria striata, OBL), wrinkle-leaved goldenrod, Sphagnum moss, redtop grass, bullrush (Scirpus hatterianus, OBL), and marsh fern (Thelypteris thelypteroides, FACW+). These wetlands are characterized by abundant groundwater seepage. The water table was generally at the soil surface or the soils were saturated to the surface and ponding of water occurred in some areas up to a depth of four inches. Field survey results confirmed the presence of hydric soils and wetland hydrology. Soil borings taken in representative areas yielded typical soil matrix colors of dark gray (10 YR 4/1), grayish brown (2.5 YR 5/2), and dark gray (5 YR 4/1) all with mottling at 10 to 12 inches in depth, indicating hydric soil conditions.

Dennison Run has fewer and less diverse palustrine emergent wetlands contiguous to it. Common plant species include bugleweed, sensitive fern (Onoclea sensibilis, FACW), New York fern, swamp blackberry (Rubus hispidus, FACW), and scattered yellow birch (Betula alleghaniensis, FAC). Wetland hydrology and hydric soils were observed during the field survey. Soil borings revealed that the water table was at the soil surface and yielded a typical soil matrix color of very dark gray (5 YR 3/1) at 10 to 12 inches in depth, indicating hydric soil conditions.

Tibbets Pond is the only NWI mapped deepwater aquatic habitat within the study area. Tibbets Pond is classified by the NWI as a lacustrine (a lake without emergent vegetation), limnetic (maximum depth greater than 2 meters) open water with an unknown bottom that is permanently flooded due to impoundment by a dam (L10WHh) (Figure 6.2-2). The lacustrine system is comprised of wetland (vegetated) and deepwater (open water) components. Although Tibbets Pond is classified by the NWI as open water, most of the pond is vegetated by a dense growth of fanwort (Cabomba caroliniana, OBL), a rooted floating aquatic macrophyte, and is actually a wetland.

The terrestrial and wetland vegetation communities within the Tonolli Corporation Site study area are commonly found throughout the Pocono Mountain region and in most cases throughout most, if not all, of Pennsylvania. None of the communities had a particularly diverse flora or was unique in any other manner. A review of the PA DER Pennsylvania Natural Diversity Inventory (PNDI) and USFWS databases revealed that no plant species of special concern (State and Federal listed rare, threatened, or endangered species) are recorded for the Tonolli Corporation Site study area and none were observed during the RMC field study.

6.3 Terrestrial and Wetland Fauna

Observations were made on five bird species, six mammal species, three reptile species, and two amphibian species during the early October field survey. The observations occurred in the relatively mature deciduous forest and the stream corridors within the forest. Field observations were supplemented with a relatively comprehensive list of species found in Carbon County on the Tamaqua Quadrangle which was obtained from the PGC which maintains a wildlife

database. This list appears as Appendix A-2. The PGC warrants that any species appearing on the list "should be viewed as likely or probable occurrence that might warrant further investigation".

Of the 16 species positively identified in the field, six are game species. These include the mourning dove, ruffed grouse, wild turkey, Eastern cottontail rabbit, gray squirrel, and white-tailed deer. All these species with the exception of the mourning dove and the Eastern cottontail rabbit prefer the deciduous forest habitat that dominates the site. The mourning dove and the Eastern cottontail rabbit prefer more brushy areas such as forest edges, areas adjacent to the culm piles, and the power line right-of-way, rather than dense forest areas. A personal communication with the district wildlife conservation officer indicates hunting pressure in the area for white-tailed deer is moderate to high during both the rifle and archery season. The deciduous forest provides ideal habitat. Deciduous forest habitat is not suitable for the ring-neck pheasant, the preferred species during small game season; therefore, hunting pressure during the small game season is not very heavy. However, some hunting of rabbits and squirrels does occur, confirmed by the presence of empty shotgun shells.

Coordination with state and federal agencies yielded no records of endangered or threatened vertebrate or invertebrate species inhabiting the study area. Responses to the PGC, PFC, USFWS, and PNDI inquiries are presented in Appendix C.

Nongame species casually observed and identified during the field investigation include the Eastern chipmunk, striped skunk, raccoon, American crow, pileated woodpecker, five-lined skink, Eastern box turtle, wood turtle, bullfrog, and the Eastern newt. All of these species are among those typically found in the habitat types present in the study area, which are common

throughout the region. The presence of unusual numbers or variety of nongame species in an area on a recurrent basis is generally accompanied by high use for nongame recreational activities, which include hiking, photography, and bird watching. As indicated by the clear evidence of hunting use, the study area is apparently open to public use. However, no evidence of significant nongame recreational activities was observed in the terrestrial habitats or along the aquatic habitats within the study area.

None of the observed species are on Pennsylvania's list of species of special concern for Carbon County (see Appendix A-3). Below, the habitat requirements for each species are discussed.

Osprey - Ospreys may be found around large bodies of water with adequate fishing opportunity. Tibbets Pond is probably not large enough, but Lake Hauto to the west of Tibbets Pond and off site may host an occasional osprey. The same stick nest is used year after year; however, no stick nests were observed.

Cooper's Hawk - Primary habitat includes extensive stands of deciduous forest or mixed conifer forests. Prey includes insects, birds, and small mammals. Extensive stands of suitable forest habitat exist in the study area.

Grasshopper sparrow - Habitat is limited to grassy or dry weedy fields (e.g., fallow farm fields). Diet consists largely of insects, and weed and grain seeds. Loss of farmland is the primary factor contributing to species decline. The type of old field habitat required by the grasshopper sparrow is not present in the study area.

Red-shouldered hawk - Primary habitat is extensive stands of forests with standing water. Diet includes small mammals, reptiles, and amphibians. While the stands of forest in this study area are extensive, they are upland forests with little or no standing water; therefore, the study area is not preferred habitat.

Snowshoe hare - The range map provided by the referenced literature indicates Carbon County as the southern limit of the range of the snowshoe hare. Hares prefer cool, shrubby bogs and other areas heavily lined with rhododendron, spruce, or hemlock. Competition with the white-tailed deer is severe, so while habitat in the study area appears ideal, competition for food and cover is limiting.

River otter - Generally extensive bodies of water are the primary habitat component for the otter, e.g., lakes, marshes, creeks, or rivers. However, in Pennsylvania otters prefer rivers and their tributaries; not the pond/lake complex or small stream systems available in the study area. Otters also prefer uninhabited areas.

Purple martin - Primarily a suburban or farm bird, martins feed exclusively on insects. Purple martin populations are at their greatest where people provide nesting boxes. Presumably if nesting boxes are available purple martins will inhabit the residential sections of the study area.

Eastern bluebird - Habitat for bluebirds include open rural country, edges of forests, open swampy woods, and roadsides. Bluebirds are cavity nesters and must find holes in trees. However, the birds are becoming increasingly dependent on artificial nest boxes. Therefore, it is possible for the forest edge or a residential nest box within the study area to host an eastern bluebird.

Common barn owl - Open agricultural areas are the favorite habitat of the barn owl. As previously mentioned, the farm field habitat is not present at the site; therefore, it is unlikely barn owls are present in the study area.

The habitats found in the study area are common for the region and provide potential for five of the nine species of special concern listed by the

PGC for Carbon County. Osprey, snowshoe hare, and Cooper's hawk have the greatest potential, since suitable habitat for these species is available in quantity. Purple martin and Eastern bluebird can be coaxed into any residential area if nest boxes are provided, but their ideal rural, open habitat is in short supply in the study area. It is important to note that none of these species were observed during the study.

It should be noted that evidence of both game and nongame wildlife was observed within the fenced facility perimeter. Deer tracks were plentiful along the abandoned landfill fringe. It is presumed that all smaller species, and especially birds, can enter and exit the facility at will.

6.4 Surface Water Resources

6.4.1 Habitat Assessment

The location of all surface water sample stations is shown in Figure 5.3-1. Location information is presented in Table 5.3-1.

Detailed description of the physical conditions observed at the stations is not presented for brevity. However, particular findings considered significant in evaluation of the resident aquatic communities are discussed. General descriptions of the streams are presented in Section 6.1.3. Riparian and other nearby watershed vegetation information is presented in Section 6.2. Appendix B contains photographs of all stations.

Results of the habitat assessment are shown in Table 6.4-1. Station PD-1 is included, despite the fact that the Secondary Parameters could not be evaluated at this location. Station PD-1 is located in a pond and the Secondary Parameters are designed to evaluate stream channels.

Habitat assessment scores display a general decline within Nesquehoning Creek from a high (120) at the most upstream control station (NC-12) to a low

(80) at the most downstream station (NC-18). This decline is most apparent downstream of Station NC-15 and is due to poor Primary (substrate and instream cover) and Secondary (channel morphology) Parameter scores. Abundance of coal-fine deposits present in the substrate in this reach of Nesquehoning Creek is a major contributor to the low scores. Coal fines are important biologically because they eliminate micro-habitat complexity and are easily eroded and transported in response to variation in stream flow. These fines apparently originate from extensive (several acres) coal refuse piles located immediately adjacent to and downstream of the Tonolli Site and were evident at all Nesquehoning Creek sample stations located downstream of NC-15.

The habitat scores assessed at the sample stations in the streams tributary to Nesquehoning Creek were very similar and averaged 120 points, a value indicating very good habitat quality. Station BR-1 had the lowest score (114) primarily due to the steep gradient of the channel. In general, habitat conditions within the tributary streams are very good.

Results of the field water quality measurements are presented in Table 6.4-2. Dissolved oxygen concentrations exceeded the PA DER minimum criterion of 5.0 mg/l for protection of aquatic life. Values ranged from 6.4 mg/l in the pond (PD-1) to 11.1 mg/l near the mouth of Dennison Run (DN-2). Therefore, dissolved oxygen did not appear to be a limiting factor at any of the stations.

Observed pH levels were within the PA DER criterion of 6.0 to 9.0 standard units. All stream values were in the slightly acidic range 6.0 to 6.9. A somewhat higher value (7.4) was measured in the pond (PD-1). A gradient of pH in Nesquehoning Creek was apparent with the lowest measurement (6.0) at Station NC-16. This may reflect an effect of the coal refuse piles located upstream of this point.

Table 6.4-1. Results of habitat assessment performed at sampling stations in Nesquehoning Creek and several tributaries in the vicinity of the Tonolli Site in Carbon County, Pennsylvania.

Station	NC12	NC13	NC14	NC15	NC16	NC17	NC18	BE1	DN1	DN2	BR1	DP1	PD1
Primary Parameters													
Bottom substr/avail cover	19	18	20	20	19	16	18	20	20	20	20	20	16
Embeddedness	20	16	16	16	8	7	8	19	20	18	20	19	8
Macro-habitat availability	13	13	12	13	14	13	9	20	19	20	13	20	1
Secondary Parameters													
Channel alteration	14	13	14	13	11	9	3	14	14	14	12	13	N/A
Bottom scour and depos'n	15	13	13	12	8	8	12	10	11	13	14	14	N/A
Macro-habitat quality	9	12	8	10	12	8	9	11	11	13	11	12	N/A
Tertiary Parameters													
Bank stability	10	7	9	7	9	8	5	10	10	10	7	10	9
Bank vegetative stability	10	9	10	7	10	9	8	10	10	10	9	10	10
Streamside cover	10	9	9	9	8	8	8	8	8	8	8	8	4
Total	120	110	111	107	99	86	80	122	123	126	114	126	48

Table 6.4-2. Water quality measurements made at sampling stations in Nesquehoning Creek and several tributaries in the vicinity of the Tonolli Site in Carbon County, Pennsylvania.

Station	NC12	NC13	NC14	NC15	NC16	NC17	NC18	BE1	DN1	DN2	BR1	DP1	PD1
Dissolved oxygen Milligrams per liter	9.7	9.6	10.1	10.2	9.7	9.0	9.9	10.6	11.0	11.1	9.8	10.3	6.4
pH Standard units	6.8	6.4	6.4	6.4	6.0	6.9	6.6	6.7	6.3	6.4	6.9	6.7	7.4
Conductivity Umhos per centimeter	23	34	30	43	68	63	50	15	12	11	16	12	25
Temperature Degrees Centigrade	16.0	15.5	15.5	15.5	14.0	15.0	13.5	14.0	11.0	12.0	13.0	11.5	18.0

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Conductivity was low at all stations; values ranged from 11 at Station DN-2 to 68 at Station NC-16. Measurements in the tributary streams were much lower than those observed in Nesquehoning Creek. There was a downstream increase in conductivity in Nesquehoning Creek to Stations NC-15 and NC-16 and then a decrease downstream. As in the case of pH, this may be an effect of coal refuse located upstream.

Water temperature ranged from a low of 11 degrees C at Station DN-1 to a high of 18 in the pond (PD-1). Temperatures in the tributary streams also were lower than those observed in Nesquehoning Creek.

Habitat conditions in Nesquehoning Creek appear to be most affected by the coal refuse piles located adjacent to and downstream of the Tonolli Site. Substantial quantities of coal fines were present in the substrate at Stations NC-16, NC-17, and NC-18; pH was reduced at Station NC-16; and conductivity was greatest at Stations NC-16; and NC-17. However, the chemical impact of this refuse did not appear to be substantial in that pH reduction was not severe, nor was conductivity great.

6.4.2 Macroinvertebrate Community

The macroinvertebrates collected and their relative abundance are listed in Table 6.4-3. The thirteen samples contained 95 macroinvertebrate taxa distributed among a wide range of insect and non-insect groups.

The samples collected at the Nesquehoning Creek sample stations yielded 51 total macroinvertebrate taxa and 11 sensitive (EPT) taxa. The variation observed among the Nesquehoning Creek sample stations roughly parallels that observed in the habitat assessment (Section 6.4.1). The greatest species richness was observed in samples collected at stations located in the upper reaches of the stream. The samples collected at Stations NC-12 through NC-14

Table 6.4-3. Macroinvertebrates observed in samples collected in Nesquehoning Creek and several tributaries in the vicinity of the Tonolli Site in Carbon County, Pennsylvania. Letters refer to relative abundance as rare (R), 1 to 3 specimens; present (P), 4 to 10 specimens; common (C), 11 to 30 specimens; abundant (A), 31 to 100 specimens; or super-abundant (SA), more than 100 specimens.

Station	NC12	NC13	NC14	NC15	NC16	NC17	NC18	BE1	DN1	DN2	BR1	DP1	PD1
Turbellaria													
<u>Cura</u>	R	-	-	-	-	-	-	-	-	-	-	-	-
<u>Dugesia</u>	C	R	-	-	-	-	-	-	-	-	-	-	-
Nemertea													
<u>Prostoma</u>	P	-	P	R	-	-	-	C	-	-	-	-	R
Oligochaeta													
Lumbricidae	C	R	R	-	-	-	-	-	-	-	P	-	P
Lumbriculidae	-	-	-	-	-	-	-	-	-	R	-	-	-
Naididae													
<u>Stylaria</u>	C	-	-	-	-	-	-	-	-	-	-	-	-
Tubificidae	-	-	-	-	-	R	-	-	-	-	-	-	-
<u>Spirosperma</u>	-	-	-	-	-	-	-	R	-	-	-	-	-
Hirudinea													
<u>Erpobdella</u>	-	-	R	-	-	-	-	-	-	-	-	-	-
Mollusca													
Bivalvia													
Sphaeriidae													
<u>Musculium</u>	-	A	A	-	-	-	-	-	-	-	-	-	-
<u>Pisidium</u>	A	-	R	R	-	-	-	-	R	C	-	P	C
<u>Sphaerium</u>	-	-	-	-	-	-	-	R	-	-	-	-	-
Viviparidae													
<u>Campeloma</u>	-	R	-	-	-	-	-	-	-	-	-	-	-
Gastropoda													
Lymnaeidae													
<u>Fossaria</u>	-	-	-	-	-	-	-	-	-	-	-	-	P
Physidae													
<u>Physella</u>	SA	C	A	R	-	-	-	-	-	-	-	-	R
Planorbidae													
<u>Helisoma</u>	-	R	C	-	-	-	-	-	-	-	-	-	C
<u>Menetus</u>	-	-	-	-	-	-	-	-	-	-	-	R	C
Arthropoda													
Amphipoda													
<u>Stygonectes</u>	-	-	-	-	-	-	R	-	-	-	C	-	-
Decapoda													
Cambaridae	-	-	-	R	-	-	-	-	P	-	R	R	-
Hydrachnidia	-	R	-	-	-	-	-	-	-	-	-	-	-

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Table 6.4-3. Continued.

Station	NC12	NC13	NC14	NC15	NC16	NC17	NC18	BE1	DN1	DN2	BR1	DP1	PD1
Insecta													
Ephemeroptera													
Baetidae													
<u>Acentrella</u>	-	-	P	-	-	-	-	R	-	-	-	R	-
<u>Acerpenna</u>	-	-	-	-	-	-	-	C	A	A	A	A	-
<u>Dipheter</u>	A	-	P	-	-	-	-	P	-	-	-	P	-
Caenidae													
<u>Caenis</u>	-	R	-	-	-	-	-	-	-	-	-	-	A
Ephemerellidae													
<u>Ephemerella</u>	-	-	-	R	-	-	-	-	-	-	-	-	-
<u>Eurylophella</u>	-	-	-	-	-	-	-	A	R	C	P	C	-
<u>Serratella</u>	-	-	-	-	-	-	-	-	-	-	-	R	-
Heptageniidae													
<u>Stenonema</u>	-	-	R	-	-	-	-	A	C	A	A	A	-
Siphonuridae													
<u>Ameletus</u>	-	-	-	-	-	-	-	-	P	A	C	C	-
Odonata													
Aeshnidae													
<u>Basiaeschna</u>	-	-	-	-	-	-	-	-	-	-	-	-	R
<u>Boyeria</u>	-	-	C	R	R	-	-	R	-	-	R	-	-
Calopterygidae													
<u>Calopteryx</u>	P	R	R	-	-	-	-	-	-	-	-	-	-
Coenagrionidae													
<u>Argia</u>	-	C	A	R	-	-	-	-	-	-	-	-	P
<u>Enallagma</u>	-	P	C	-	-	-	-	-	-	-	-	-	C
<u>Ischnura</u>	-	R	-	-	-	-	-	-	-	-	-	-	C
Cordulegastridae													
<u>Cordulegaster</u>	-	-	-	R	-	-	-	R	-	R	-	-	-
Corduliidae													
	R	-	-	-	-	-	-	-	-	-	-	-	C
Gomphidae													
<u>Lanthus</u>	-	-	-	-	-	-	-	R	R	R	-	R	-
Libellulidae													
	-	R	-	-	-	-	-	-	-	-	-	-	R
Plecoptera													
Chloroperlidae													
<u>Sweltsa</u>	-	-	-	-	-	-	-	C	C	P	C	A	-
Leuctridae													
	-	-	-	-	-	-	-	R	P	C	-	A	-
Peltoperlidae													
	-	-	-	-	-	-	-	P	A	A	R	C	-
Perlidae													
<u>Acroneuria</u>	-	-	-	-	-	-	-	C	-	R	C	C	-
Perlodidae													
<u>Diura</u>	-	-	-	-	-	-	-	-	P	P	-	R	-
<u>Isoperla</u>	-	-	-	-	-	-	-	R	A	C	-	C	-
Pteronarcyidae													
<u>Pteronarcys</u>	-	-	-	-	-	-	-	R	-	R	P	P	-
Taeniopterygidae													
	-	-	-	-	-	-	-	-	P	P	R	P	-

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Table 6.4-3. Continued.

Station	NC12	NC13	NC14	NC15	NC16	NC17	NC18	BE1	DN1	DN2	BR1	DP1	PD1
Insecta (continued)													
Hemiptera													
Gerridae													
<u>Gerris</u>	-	-	-	-	-	-	-	R	R	R	-	-	-
Veliidae													
<u>Microvelia</u>	R	-	-	-	-	-	-	-	-	-	R	-	-
<u>Rhagovelia</u>	-	-	-	-	-	R	-	-	-	-	R	R	-
Trichoptera													
Brachycentridae													
<u>Micrasema</u>	-	-	-	-	-	-	-	-	R	R	-	-	-
Glossosomatidae													
<u>Glossosoma</u>	-	-	-	-	-	-	-	P	-	R	C	-	-
Hydropsychidae													
<u>Cheumatopsyche</u>	A	A	C	R	-	-	-	-	-	-	P	-	-
<u>Diplectrona</u>	-	-	-	-	-	R	-	A	A	A	A	A	-
<u>Hydropsyche</u>	SA	SA	SA	C	C	-	P	C	-	A	C	P	-
Leptoceridae													
<u>Mystacides</u>	C	-	-	-	-	-	-	-	-	-	-	-	-
<u>Nectopsyche</u>	-	-	-	-	-	-	-	-	-	-	-	-	A
<u>Triaenodes</u>	-	-	-	-	-	-	-	-	-	-	-	R	-
Limnephilidae													
Molannidae													
<u>Molanna</u>	-	-	-	-	-	-	-	R	-	-	R	R	-
Philopotamidae													
<u>Chimarra</u>	-	-	R	-	-	-	-	-	-	-	-	-	-
<u>Dolophilodes</u>	-	-	-	-	-	-	-	C	-	A	C	P	-
Polycentropodidae													
<u>Polycentropus</u>	R	-	-	-	-	-	R	P	P	-	-	P	-
Rhyacophilidae													
<u>Rhyacophila</u>	-	-	-	-	-	-	-	C	C	C	C	P	-
Megaloptera													
Corydalidae													
<u>Nigronia</u>	R	-	-	R	-	-	-	-	-	-	-	-	-
Sialidae													
<u>Sialis</u>	-	-	-	-	-	R	-	-	-	-	-	-	-
Coleoptera													
Chrysomelidae													
<u>Donacia</u>	-	R	-	-	-	-	-	-	-	-	-	-	-
Dryopidae													
<u>Helichus</u>	-	-	-	-	-	-	-	-	-	-	-	-	R
Dytiscidae													
	-	-	-	-	-	-	-	-	-	-	-	-	C

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Table 6.4-3. Continued.

Station	NC12	NC13	NC14	NC15	NC16	NC17	NC18	BE1	DN1	DN2	BR1	DP1	PD1
Coleoptera (continued)													
Elmidae													
<u>Dubiraphia</u>	-	-	-	-	-	-	-	R	-	-	-	-	R
<u>Optioservus</u>	-	-	-	-	-	-	-	C	R	C	R	A	-
<u>Oulimnius</u>	-	-	-	-	-	-	-	-	-	R	-	-	-
<u>Promoresia</u>	-	-	-	-	-	-	-	R	R	A	-	A	R
<u>Stenelmis</u>	C	-	-	-	-	-	-	-	-	-	-	-	R
Gyrinidae													
<u>Dineutus</u>	R	C	P	R	R	-	-	P	-	-	-	-	-
Halipilidae													
<u>Peltodytes</u>	-	-	P	-	-	-	-	-	-	-	-	-	C
Hydrophilidae													
<u>Psephenidae</u>	-	-	R	-	-	-	-	-	-	-	-	-	-
Psephenidae													
<u>Ectopria</u>	-	-	-	-	-	-	-	C	-	R	-	C	-
<u>Psephenus</u>	R	-	-	-	-	-	-	-	-	-	-	-	-
Diptera													
Ceratopogonidae													
<u>Chironomidae</u>	A	A	A	C	P	C	P	A	A	SA	A	A	SA
Dixidae													
<u>Dixidae</u>	-	-	-	-	-	-	-	-	-	R	R	R	-
Empididae													
<u>Clinocera</u>	-	-	-	-	-	-	-	R	-	R	-	-	-
<u>Hemerodromia</u>	-	-	-	-	-	-	R	-	-	-	-	-	-
Muscidae													
<u>Muscidae</u>	-	-	-	-	-	-	-	R	-	-	-	-	-
Ptychopteridae													
<u>Ptychoptera</u>	-	-	-	-	-	-	-	-	-	P	-	-	-
Simuliidae													
<u>Simulium</u>	A	A	A	P	C	-	-	-	R	A	C	A	-
Tabanidae													
<u>Chrysops</u>	-	-	-	-	-	-	-	P	-	P	-	-	-
Tipulidae													
<u>Antocha</u>	-	-	-	R	-	-	-	-	-	P	R	P	-
<u>Antocha</u>	-	-	-	-	-	-	-	R	P	P	-	R	-
<u>Dicranota</u>	-	-	R	-	-	P	-	P	-	R	-	-	-
<u>Hexatoma</u>	-	-	-	-	-	R	-	C	P	P	P	C	-
<u>Limnophila</u>	-	-	-	-	-	-	-	P	R	-	R	-	-
<u>Ormosia</u>	-	-	-	-	-	-	-	-	R	P	-	-	-
<u>Tipula</u>	-	-	R	-	P	P	R	R	R	-	P	P	-
Total Taxa	21	18	24	15	6	8	6	40	29	40	31	37	22
Sensitive (EPT) Taxa	5	3	6	3	1	1	2	18	15	19	17	22	2
EPT/Chironomidae Ratio	5.4	4.1	3.6	1.2	2.8	0.1	1.0	5.4	5.5	3.0	5.6	7.4	0.7

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contained an average of 21.0 total taxa and 4.7 sensitive taxa, whereas these parameters in the samples collected further downstream were substantially reduced. In addition, the relative abundance of all taxa common to the two groups of stations was reduced at the downstream stations, in some cases substantially. Therefore, it is clear that the macroinvertebrate communities present in Nesquehoning Creek vary considerably from the upper to lower reaches of the study area. Those in the upper reaches are characterized by moderate diversity and the presence of several taxa considered sensitive to environmental stress. Those in the lower reaches of Nesquehoning Creek are characterized by very low diversity and very few sensitive taxa or individuals, and, therefore, appear to be under the effect of environmental stress.

The samples collected at the stations located in tributaries to Nesquehoning Creek yielded 77 total macroinvertebrate taxa and 28 sensitive taxa. The samples collected at these stations contained an average of 35.4 total taxa and 18.2 sensitive taxa. The macroinvertebrate communities present in the tributaries to Nesquehoning Creek sampled during this study are characterized by moderate to high diversity and contain considerable numbers and taxa of macroinvertebrates considered sensitive to environmental stress.

The samples collected in the pond yielded 22 total taxa and 2 sensitive taxa. This moderate diversity and restricted presence of sensitive taxa are not unexpected in systems with limited habitat variability. In addition, the majority of sensitive taxa are usually restricted to flowing waters. In general, the macroinvertebrate community present in this pond is typical of such environments.

Both the PFC and the PA DER, Bureau of Water Quality Management, were contacted to obtain existing biological data for the study area. The PFC indicated that it conducted no studies in or near the study area. However,

PA DER conducted a macroinvertebrate survey of Nesquehoning Creek with one sample station located within the Tonolli Corporation Site study area on 5 June 1980. The data for this station (located approximately 500 feet upstream of Station NC-17) were very similar to that collected at Station NC-17. Six macroinvertebrate taxa were collected in the PA DER survey, all but Chironomidae in very low numbers.

6.4.3 Fish Community

The results of the fish community sampling effort are presented in Table 6.4-4. The thirteen samples yielded a total of 349 specimens representing 9 species.

The sample stations in Nesquehoning Creek yielded 10 specimens of 8 species. All were small specimens of the 1+ or 2+ year class, and, with exception of two white suckers collected at Station NC-15, all species were represented by single individuals. These results indicate a very depauperate fish community in Nesquehoning Creek. Considering the definition of a community as a conglomerate of interdependent populations, it is questionable if this section of Nesquehoning Creek contains a fish community. It is possible that the sampling effort evaluated the numbers of individuals transient from tributaries or impoundments present in the upper reaches of this stream system.

The sample stations located in streams tributary to Nesquehoning Creek yielded 64 specimens representing two species. The majority of these specimens were brook trout. The variety in size and presence of gravid females and males in spawning color indicate a viable native brook trout population and the potential for recreational fishing activities.

Table 6.4-4. Results of electrofishing conducted at surface water sampling stations in Nesquehoning Creek and several tributaries in the vicinity of the Toncill Site in Carbon County, Pennsylvania. The letters behind the scientific name indicates status as game fish (G); and tolerance to environmental stress as sensitive (S), intermediate (I), or tolerant (T).

Station	NC12	NC13	NC14	NC15	NC16	NC17	NC18	BE1	DN1	DN2	BR1	DP1	PD1
Salmonidae - trout family													
Salvelinus fontinalis	G	S											
Brook trout				1	-	-	1	-	19	7	12	10	12
Cyprinidae - minnow family													
Rhinichthys cataractae	I												
Longnose dace									4	-	-	-	-
Catostomidae - sucker family													
Catostomus commersoni	T												
White sucker					2	-	-	-	-	-	-	-	-
Ictaluridae - catfish family													
Ictalurus natalis	G	T											
Yellow bullhead				1	-	-	-	-	-	-	-	-	-
Ictalurus nebulosus	G	T											
Brown bullhead				1	-	-	-	-	-	-	-	-	-
Centrarchidae - sunfish family													
Lepomis gibbosus	G	I											
Pumpkinseed sunfish				1	-	-	-	-	-	-	-	-	9
Lepomis macrochirus	G	I											
Bluegill sunfish			1	-	-	-	-	-	-	-	-	-	229
Micropterus salmoides	G	I											
Largemouth bass			1	-	-	-	-	-	-	-	-	-	37
Percidae - perch family													
Etheostoma olmstedii	I												
Tessellated darter			1	-	-	-	-	-	-	-	-	-	-
Number of Specimens	0	3	4	2	0	1	0	23	7	12	10	12	275
Total Species	0	3	4	1	0	1	0	2	1	1	1	1	3
Game Species	0	2	4	0	0	1	0	1	1	1	1	1	3
Sensitive Species	0	1.5	1.5	0	0	1	0	1.5	1	1	1	1	1.5

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The pond sample yielded 275 specimens representing three species. The majority of these specimens were bluegill sunfish which varied considerably in size. Several largemouth bass collected were over eight inches in length. The seining apparatus used limited sampling efforts to the outer edges of the pond. Therefore, it is possible that much larger bass are present in the deeper waters of the pond with a potential for a recreational fishery.

Contact was made with the PFC concerning recreational fishing in the study area. David Arnold, Area Fisheries Manager, indicated that he had no information concerning recreational fishing in the study area. However, Wayne Alfano, Waterways Conservation Officer for Carbon County, stated that there is no recreational fishing in Nesquehoning Creek in the study area because the fishery is almost non-existent. Alfano did indicate that Lake Hauto is a popular recreational fishing area, a statement supported by Richard Carper, Wildlife Conservation Officer with the PGC. Lake Hauto is a privately owned lake that is located approximately one mile southwest of the Tonolli Corporation Site.

Waterways Conservation Officer Alfano also indicated that recreational fishing by children may occur in the pond located near the confluence of Broad Run and Nesquehoning Creek. However, he has not observed this activity.

No state or federally listed endangered or threatened fish species were collected. Furthermore, coordination with the PFC and the USFWS confirmed that none of these protected species is known to exist in or in the immediate vicinity of the study area.

Copies of all coordination letters and telephone call records are contained in Appendix C.

6.5 Summary

Terrestrial and wetlands resources contained within the Tonolli Corporation Site and a 0.5 mile radius around it were investigated on 7 September and 2 through 4 October 1990. These resources consist of deciduous forest, scrub/shrub, mixed scrub/shrub-herbaceous, herbaceous, and floating aquatic macrophytic plant communities. Most of this study area is mature deciduous forest associated primarily with the slopes of Broad Mountain to the north and Nesquehoning Mountain to the south. The other communities are spread along the Nesquehoning Valley floor. There is no obvious evidence of vegetation stress due to the Tonolli Corporation Site. The Site itself is industrial land with limited vegetation present, generally situated near the edges of the property.

The majority of the vegetation communities in the study area are non-wetland. However, wetland communities are associated with Tibbets Pond, Bear Creek, Dennison Run, and Nesquehoning Creek or occur as isolated pockets in mine spoil areas. Wetlands present in the study area are classified as forested, palustrine scrub/shrub-herbaceous, palustrine emergent, and lacustrine limnetic. There are no wetlands present on the Tonolli Corporation Site.

The terrestrial and wetland vegetation community types within the study area are commonly found throughout the Pocono Mountain region and in most cases throughout most, if not all, of Pennsylvania. None of the communities has a particularly diverse flora or is unique in any other manner. Review of the PA DER Pennsylvania Natural Diversity Inventory and U.S. Fish and Wildlife Service databases revealed that no plant species of special concern (State and Federal listed rare, threatened, or endangered species) are recorded for the study area and none were observed during the field study.

Among the wildlife observed during the early October field survey were six game species: mourning dove, ruffed grouse, wild turkey, Eastern cottontail rabbit, gray squirrel, and white-tailed deer. The PA Game Commission Wildlife Conservation Officer indicated that hunting pressure for white-tailed deer in the area is moderate to high. Hunting pressure during small game season is not great, although some hunting of rabbits and squirrels does occur. No evidence of unusual quantity or diversity of nongame vertebrate or invertebrate species was observed. Wildlife is clearly able to enter and exit the Tonolli Corporation Site itself at will, despite the fence which surrounds the site. Coordination with state and federal agencies resulted in no records of endangered or threatened vertebrate or invertebrate species inhabiting the study area.

Aquatic resources present in the study area include Nesquehoning Creek, Bear Creek, Dennison Run, Broad Run, Deep Run, and a small pond located near the confluence of Broad Run and Nesquehoning Creek. Fish and benthic macroinvertebrate samples were collected at twelve stations established in these water bodies on 19 through 21 September 1990. The four streams tributary to Nesquehoning Creek support apparently reproducing populations of brook trout and diverse macroinvertebrate communities. Not surprisingly, these streams are designated by PA DER as High Quality-Cold Water Fisheries.

Nesquehoning Creek is designated by PA DER as a Cold Water Fishery. However, the fish sampling conducted in this study resulted in collection of ten individuals of only eight species at the seven sampling stations located upstream and downstream of the Tonolli Corporation Site. The PA Fish Commission is aware of this depauperate community as indicated through communication with the Area Fisheries Manager and the local Waterways Conservation Officer. The benthic macroinvertebrate communities present at the Nesquehoning Creek

sampling stations were characterized as having only low to moderate diversity. Lower macroinvertebrate diversity was observed downstream relative to upstream of the Tonolli Corporation Site. However, it is noteworthy that large coal spoil piles are located near the stream at this point and quantities of these materials are present in the stream channel. These coal spoil materials probably adversely impact the macroinvertebrate community.

Both the fish and macroinvertebrate communities present in the pond located near the confluence of Broad Run and Nesquehoning Creek are typical of such water bodies. The fish community is dominated by bluegill sunfish of various sizes and largemouth bass over 8 inches in length were collected, indicating that a potential recreational fishery exists.

According to the PA Fish Commission, no recreational fishing occurs in Nesquehoning Creek due to the near absence of fish and it is unknown if any recreational fishing takes place in the pond. However, considerable recreational fishing occurs in Lake Hauto, located to the west and upstream of the Tonolli Corporation Site, outside of the study area.

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APPENDIX A
Species Lists

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Table A-1. Dominant plant species identified in the Tonolli Corporation Site study area located in the Village of Hauta, Carbon County, Pennsylvania.

Scientific Name	Common Name	Indicator Status
Trees:		
<u>Acer pensylvanicum</u>	striped maple	FACU
<u>Acer rubrum</u>	red maple	FAC
<u>Betula lenta</u>	sweet birch	FACU
<u>Betula populifolia</u>	gray birch	FAC
<u>Nyssa sylvatica</u>	black tupelo	FAC
<u>Pinus banksiana</u>	jack pine	FACU
<u>Populus tremula</u>	quaking aspen	FACU
<u>Quercus alba</u>	white oak	FACU
<u>Quercus bicolor</u>	swamp white oak	FACW+
<u>Quercus prinus</u>	chestnut oak	UPL
<u>Quercus rubra</u>	northern red oak	FACU-
<u>Sassafras albidum</u>	sassafras	FACU
<u>Tsuga canadensis</u>	eastern hemlock	FACU
Shrubs:		
<u>Gaultheria procumbens</u>	teaberry	FACU
<u>Hamamelis virginiana</u>	witch hazel	FAC-
<u>Kalmia angustifolia</u>	sheep laurel	FAC
<u>Kalmia latifolia</u>	mountain laurel	FACU
<u>Rhododendron maximum</u>	great rhododendron	FAC
<u>Rubus allegheniensis</u>	Allegheny blackberry	FACU-
<u>Spiraea tomentosa</u>	steplebush	FACW
<u>Vaccinium angustifolium</u>	lowbush blueberry	FACU-
<u>Vaccinium corymbosum</u>	highbush blueberry	FACW
<u>Viburnum dentatum</u>	arrow-wood	FAC
Vines:		
<u>Smilax rotundifolia</u>	common greenbrier	FAC
Forbs:		
<u>Aralia nudicaulis</u>	wild sarsaparilla	FACU
<u>Aster divaricatus</u>	mountain aster	UPL
<u>Calomba caroliniana</u>	fanwort	OBL
<u>Eupatorium perfoliatum</u>	boneset	OBL
<u>Lycopus spp.</u>	bugleweed	OBL
<u>Mimulus ringens</u>	monkey flower	OBL
<u>Phragmites australis</u>	common reed	FACW

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Table A-1.

Scientific Name	Common Name	Indicator Status
Forbs: (continued)		
<u>Polygonum pensylvanicum</u>	Pennsylvania smartweed	FACW
<u>Polygonum sagittatum</u>	arrow-leaf tearthumb	OBL
<u>Solidago rugosa</u>	wrinkle-leaved goldenrod	FAC
<u>Sparganium</u> spp.	burreed	OBL
<u>Typha latifolia</u>	common cattail	OBL
Ferns and Fern Allies:		
<u>Comptonia peregrina</u>	sweet fern	UPL
<u>Dennstaedtia punctilobula</u>	hayscented fern	UPL
<u>Dryopteris marginalis</u>	marginal wood fern	FACU-
<u>Lycopodium tristachyum</u>	ground pine	UPL
<u>Osmunda cinnamomea</u>	cinnamon fern	FACW
<u>Pteridium aquilinum</u>	bracken fern	UPL
<u>Thelypteris noveboracensis</u>	New York fern	FAC
<u>Thelypteris thelypteroides</u>	marsh fern	FACW+
Grasses and Grasslikes:		
<u>Agrostis alba</u>	redtop	FACW
<u>Aristida dichotoma</u>	three-awn grass	UPL
<u>Carex</u> spp.	sedges	FACU-OBL
<u>Carex lurida</u>	shallow sedge	OBL
<u>Dichanthelium dichotomum</u>	deer-tongue witchgrass	FAC+
<u>Eulalia viminea</u>	stilt grass	FAC
<u>Glyceria striata</u>	fowl mannagrass	OBL
<u>Juncus effusus</u>	soft rush	FACW+
<u>Schizachyrium scoparium</u>	little bluestem	FACU-
<u>Scirpus cyperinus</u>	woolgrass	FACW+
<u>Scirpus hattorianus</u>	bullrush	OBL
Mosses:		
<u>Sphagnum</u> spp.	peat moss	OBL

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Appendix A-2. Vertebrate species occurring in the Tamaqua Quadrangle, Carbon County, Pennsylvania.
List provided by the Pennsylvania Game Commission via the Pennsylvania Fish and Wildlife Database.
Those species observed during the 1990 site survey are noted under Site Survey column.

Scientific Name	Common Name	Site Survey
Amphibians:		
<u>Acris crepitans</u>	Frog, Northern cricket	
<u>Ambystoma jeffersonianum</u>	Salamander, Jefferson	
<u>Ambystoma maculatum</u>	Salamander, Spotted	
<u>Ambystoma opacum</u>	Salamander, Marbled	
<u>Bufo woodhousei fowleri</u>	Toad, Fowler's	
<u>Desmognathus fuscus f.</u>	Salamander, Northern dusky	
<u>Desmognathus ochrophaeus</u>	Salamander, Mountain dusky	
<u>Furycea bislineata</u>	Salamander, Northern two-lined	
<u>Furycea longicauda</u>	Longtail salamander	
<u>Gyrinophilus porphyriticus p.</u>	Salamander, Northern spring	
<u>Hyla crucifer</u>	Peeper, Northern spring	
<u>Notophthalmus viridescens</u>	Newt, Eastern	X
<u>Notophthalmus viridescens v.</u>	Newt, Red-spotted	
<u>Pseudacris triseriata feriarum</u>	Frog, Upland chorus	
<u>Pseudotriton ruber r.</u>	Salamander, Northern red	
<u>Plethodon cinereus</u>	Salamander, Redback	
<u>Plethodon glutinosus</u>	Salamander, Slimy	
<u>Rana catesbeiana</u>	Bullfrog	X

Birds:		
<u>Accipiter cooperii</u>	Hawk, Cooper's	
<u>Accipiter gentilis</u>	Goshawk, Northern	
<u>Accipiter striatus</u>	Hawk, Sharp-shinned	
<u>Actitis macularia</u>	Sandpiper, Spotted	
<u>Aegolius acadicus</u>	Owl, Northern saw-whet	
<u>Agelaius phoeniceus</u>	Blackbird, Red-winged	
<u>Aix sponsa</u>	Duck, Wood	
<u>Ammodramus caudatus</u>	Sparrow, Sharp-tailed	
<u>Ammodramus henslowii</u>	Sparrow, Henslow's	
<u>Ammodramus savannarum</u>	Sparrow, Grasshopper	

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Appendix A-2. (continued)

Scientific Name	Common Name	Site Survey
Birds: (continued)		
<u>Anas americana</u>	Wigeon, American	
<u>Anas crecca</u>	Teal, Green-winged	
<u>Anas discors</u>	Teal, Blue-winged	
<u>Anas platyrhynchos</u>	Mallard	
<u>Anas strepera</u>	Gadwall	
<u>Aquila chrysaetos</u>	Eagle, Golden	
<u>Archilochus colubris</u>	Hummingbird, Ruby-throated	
<u>Asio flammeus</u>	Owl, Short-eared	
<u>Asio otus</u>	Owl, Long-eared	
<u>Avthya affinis</u>	Scaup, Lesser	
<u>Avthya americana</u>	Redhead	
<u>Avthya collaris</u>	Duck, Ring-necked	
<u>Avthya marila</u>	Scaup, Greater	
<u>Avthya valisineria</u>	Canvasback	
<u>Batrachia longicauda</u>	Sandpiper, Upland	
<u>Bombycilla cedrorum</u>	Waxwing, Cedar	
<u>Bonasa umbellus</u>	Grouse, Ruffed	
<u>Botaurus lentiginosus</u>	Bittern, American	
<u>Branta canadensis</u>	Goose, Canada	
<u>Bubo virginianus</u>	Owl, Great horned	
<u>Bucephala albeola</u>	Bufflehead	
<u>Bucephala clangula</u>	Goldeneye, Common	
<u>Buteo jamaicensis</u>	Hawk, Red-tailed	
<u>Buteo lagopus</u>	Hawk, Rough-legged	
<u>Buteo lineatus</u>	Hawk, Red-shouldered	
<u>Buteo platypterus</u>	Hawk, Broad-winged	
<u>Butorides striatus</u>	Heron, Green-backed	
<u>Calcarius lapponicus</u>	Longspur, Lapland	
<u>Calidris alpina</u>	Dunlin	
<u>Calidris melanotos</u>	Sandpiper, Pectoral	
<u>Calidris pusilla</u>	Sandpiper, Semipalmated	
<u>Caprimulgus vociferus</u>	Whip-poor-will	
<u>Cardinalis cardinalis</u>	Cardinal, Northern	
<u>Carduelis flammea</u>	Redpoll, Common	

X

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Appendix A-2. (continued)

Scientific Name	Common Name	Site Survey
Birds: (continued)		
<u>Carduelis pinus</u>	Siskin, Pine	
<u>Carduelis tristis</u>	Goldfinch, American	
<u>Carpodacus mexicanus</u>	Finch, House	
<u>Carpodacus purpureus</u>	Finch, Purple	
<u>Cathartes aura</u>	Vulture, Turkey	
<u>Catharus fuscescens</u>	Veery	
<u>Catharus guttatus</u>	Thrush, Hermit	
<u>Catharus minimus</u>	Thrush, Gray-cheeked	
<u>Catharus ustulatus</u>	Thrush, Swainson's	
<u>Certhia americana</u>	Creepers, Brown	
<u>Ceryle alcyon</u>	Kingfisher, Belted	
<u>Chaetura pelagica</u>	Swift, Chimney	
<u>Charadrius semipalmatus</u>	Plover, Semipalmated	
<u>Charadrius vociferus</u>	Killdeer	
<u>Chen caerulescens</u> c.	Goose, Lesser snow	
<u>Chlidonias niger</u>	Tern, Black	
<u>Chordeiles minor</u>	Nighthawk, Common	
<u>Circus cyaneus</u>	Harrier, Northern	
<u>Coccythraustes vespertinus</u>	Grosbeak, Evening	
<u>Coccyzus americanus</u>	Cuckoo, Yellow-billed	
<u>Coccyzus erythrophthalmus</u>	Cuckoo, Black-billed	
<u>Colaptes auratus</u>	Flicker, Northern	
<u>Columba livia</u>	Dove, Rock	
<u>Contopus borealis</u>	Flycatcher, Olive-sided	
<u>Contopus virens</u>	Pewee, Eastern wood	
<u>Corvus brachyrhynchos</u>	Crow, American	
<u>Corvus ossifragus</u>	Crow, Fish	
<u>Cyanocitta cristata</u>	Jay, Blue	
<u>Dendroica caerulescens</u>	Warbler, Black-throated blue	
<u>Dendroica castanea</u>	Warbler, Bay-breasted	
<u>Dendroica cerulea</u>	Warbler, Cerulean	
<u>Dendroica coronata</u>	Warbler, Yellow-rumped	
<u>Dendroica discolor</u>	Warbler, Prairie	
<u>Dendroica dominica</u>	Warbler, Yellow-throated	

X

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Appendix A-2. (continued)

Scientific Name	Common Name	Site Survey
Birds: (continued)		
<u>Dendroica fusca</u>	Warbler, Blackburnian	
<u>Dendroica magnolia</u>	Warbler, Magnolia	
<u>Dendroica pennsylvanica</u>	Warbler, Chestnut-sided	
<u>Dendroica petechia</u>	Warbler, Yellow	
<u>Dendroica pinus</u>	Warbler, Pine	
<u>Dendroica striata</u>	Warbler, Blackpoll	
<u>Dendroica tigrina</u>	Warbler, Cape May	
<u>Dendroica virens</u>	Warbler, Black-throated green	
<u>Dolichonyx oryzivorus</u>	Bobolink	
<u>Dryocopus pileatus</u>	Woodpecker, Pileated	
<u>Dumetella carolinensis</u>	Catbird, Gray	
<u>Empidonax alnorum</u>	Flycatcher, Alder	
<u>Empidonax flaviventris</u>	Flycatcher, Yellow-bellied	
<u>Empidonax traillii</u>	Flycatcher, Willow	
<u>Empidonax virescens</u>	Flycatcher, Acadian	
<u>Eremophila alpestris praticola</u>	Lark, Horned	
<u>Falco columbarius</u>	Merlin	
<u>Falco peregrinus tundrius</u>	Falcon, Peregrine	
<u>Falco sparverius</u>	Kestrel, American	
<u>Florida caerulea</u>	Heron, Little blue	
<u>Fulica americana</u>	Coot, American	
<u>Gallinula chloropus</u>	Gallinule, Common	
<u>Gallinago gallinago</u>	Snipe, Common	
<u>Gavia immer</u>	Loon, Common	
<u>Geothlypis trichas brachidactylus</u>	Yellowthroat, Common	
<u>Guiraca caerulea</u>	Grosbeak, Blue	
<u>Haliaeetus leucocephalus</u>	Eagle, Bald	
<u>Helmitheros vermivorus</u>	Warbler, Worm-eating	
<u>Hirundo pyrrhonota</u>	Swallow, Cliff	
<u>Hirundo rustica</u>	Swallow, Barn	
<u>Hylocichla mustelina</u>	Thrush, Wood	
<u>Icteria virens</u>	Chat, Yellow-breasted	
<u>Icterus galbula</u>	Oriole, Northern	
<u>Icterus spurius</u>	Oriole, Orchard	

X

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Appendix A-2. (continued)

Scientific Name	Common Name	Site Survey
Birds: (continued)		
<u>Junco hyemalis</u>	Junco, Dark-eyed	
<u>Lanius excubitor</u>	Shrike, Northern	
<u>Lanius ludovicianus</u>	Shrike, Loggerhead	
<u>Larus argentatus</u>	Gull, Herring	
<u>Larus delawarensis</u>	Gull, Ring-billed	
<u>Larus philadelphia</u>	Gull, Bonaparte's	
<u>Limnodromus griseus</u>	Dowitcher, Short-billed	
<u>Lophodytes cucullatus</u>	Merganser, Hooded	
<u>Loxia curvirostra</u>	Crossbill, Red	
<u>Loxia leucoptera</u> L.	Crossbill, White-winged	
<u>Melanerpes carolinus</u>	Woodpecker, Red-bellied	
<u>Melanerpes erythrocephalus</u>	Woodpecker, Red-headed	
<u>Melanitta fusca</u>	Scoter, White-winged	
<u>Melanitta nigra</u>	Scoter, Black	
<u>Melospiza georgiana</u>	Sparrow, Swamp	
<u>Melospiza lincolni</u>	Sparrow, Lincoln's	
<u>Melospiza melodia</u>	Sparrow, Song	
<u>Meleagris gallopavo</u>	Turkey, Wild	
<u>Mergus merganser</u>	Merganser, Common	
<u>Mimus polyglottos</u>	Mockingbird, Northern	
<u>Mniotilta varia</u>	Warbler, Black-and-white	
<u>Molothrus ater</u>	Cowbird, Brown-headed	
<u>Myiarchus crinitus</u>	Flycatcher, Great crested	
<u>Oporornis philadelphia</u>	Warbler, Mourning	
<u>Otus asio</u>	Owl, Eastern screech	
<u>Oxyura jamaicensis</u>	Duck, Ruddy	
<u>Pandion haliaetus</u>	Osprey	
<u>Parula americana</u>	Warbler, Northern parula	
<u>Parus atricapillus</u>	Chickadee, Black-capped	
<u>Parus bicolor</u>	Titmouse, Tufted	
<u>Passer domesticus</u>	Sparrow, House	
<u>Passerculus sandwichensis</u>	Sparrow, Savannah	
<u>Passerella iliaca</u>	Sparrow, Fox	
<u>Passerina cyanea</u>	Bunting, Indigo	

X

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Appendix A-2. (continued)

Scientific Name	Common Name	Site Survey
Birds: (continued)		
<u>Phalaropus lobatus</u>	Phalarope, Red-necked	
<u>Phasianus colchicus</u>	Pheasant, Ring-necked	
<u>Pheucticus ludovicianus</u>	Grosbeak, Rose-breasted	
<u>Picoides pubescens</u>	Woodpecker, Downy	
<u>Picoides villosus</u>	Woodpecker, Hairy	
<u>Pipilo erythrophthalmus</u>	Towhee, Rufous-sided	
<u>Piranga olivacea</u>	Tanager, Scarlet	
<u>Piranga rubra</u>	Tanager, Summer	
<u>Plectrophenax nivalis</u>	Bunting, Snow	
<u>Pluvialis dominica</u>	Plover, Lesser-golden	
<u>Pluvialis squatarola</u>	Plover, Black-bellied	
<u>Podiceps auritus</u>	Grebe, Horned	
<u>Podiceps grisegena</u>	Grebe, Red-necked	
<u>Podilymbus podiceps</u>	Grebe, Pied-billed	
<u>Polioptila caerulea</u>	Gnatcatcher, Blue-gray	
<u>Porzana carolina</u>	Sora	
<u>Progne subis</u>	Martin, Purple	
<u>Quiscalus quiscula</u>	Grackle, Common	
<u>Rallus limicola</u>	Rail, Virginia	
<u>Regulus calendula</u>	Kinglet, Ruby-crowned	
<u>Regulus satrapa</u>	Kinglet, Golden-crowned	
<u>Riparia riparia</u>	Swallow, Bank	
<u>Sayornis phoebe</u>	Phoebe, Eastern	
<u>Scolopax minor</u>	Woodcock, American	
<u>Seiurus aurocapillus</u>	Ovenbird	
<u>Seiurus motacilla</u>	Waterthrush, Louisiana	
<u>Seiurus noveboracensis</u>	Waterthrush, Northern	
<u>Setophaga ruticilla</u>	Redstart, American	
<u>Sialia sialis</u>	Bluebird, Eastern	
<u>Sitta canadensis</u>	Nuthatch, Red-breasted	
<u>Sitta carolinensis</u>	Nuthatch, White-breasted	
<u>Sphyrapicus varius</u>	Sapsucker, Yellow-bellied	
<u>Spiza americana</u>	Dickcissel	
<u>Spizella arborea</u>	Sparrow, American tree	

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Appendix A-2. (continued)

Site Survey

Scientific Name

Common Name

Birds: (continued)

<u>Spizella passerina</u>	Sparrow, Chipping
<u>Spizella pusilla</u>	Sparrow, Field
<u>Stelgidopteryx serripennis</u>	Swallow, Northern rough-winged
<u>Sterna hirundo</u>	Tern, Common
<u>Strix varia</u>	Owl, Barred
<u>Sturnella magna</u>	Meadowlark, Eastern
<u>Sturnus vulgaris</u>	Starling, European
<u>Tachycineta bicolor</u>	Swallow, Tree
<u>Thryothorus ludovicianus</u>	Wren, Carolina
<u>Toxostoma rufum</u>	Thrasher, Brown
<u>Iringa flavipes</u>	Yellowlegs, Lesser
<u>Iringa melanoleuca</u>	Yellowlegs, Greater
<u>Iringa solitaria</u>	Sandpiper, Solitary
<u>Troglodytes aedon</u>	Wren, House
<u>Troglodytes troglodytes</u>	Wren, Winter
<u>Turdus migratorius</u>	Robin, American
<u>Tyrannus tyrannus</u>	Kingbird, Eastern
<u>Tyto alba</u>	Owl, Common barn
<u>Vermivora chrysoptera</u>	Warbler, Golden-winged
<u>Vermivora peregrina</u>	Warbler, Tennessee
<u>Vermivora pinus</u>	Warbler, Blue-winged
<u>Vermivora ruficapilla</u>	Warbler, Nashville
<u>Vireo flavifrons</u>	Vireo, Yellow-throated
<u>Vireo gilvus</u>	Vireo, Warbling
<u>Vireo olivaceus</u>	Vireo, Red-eyed
<u>Vireo philadelphicus</u>	Vireo, Philadelphia
<u>Vireo solitarius</u>	Vireo, Solitary
<u>Wilsonia canadensis</u>	Warbler, Canada
<u>Wilsonia citrina</u>	Warbler, Hooded
<u>Wilsonia pusilla</u>	Warbler, Wilson's
<u>Zenaidura macroura</u>	Dove, Mourning
<u>Zonotrichia albicollis</u>	Sparrow, White-throated
<u>Zonotrichia leucophrys</u>	Sparrow, White-crowned

Appendix A-2. (continued)

Scientific Name	Common Name	Site Survey
Mammals:		
<u>Blarina brevicauda</u>	Shrew, Northern short-tailed	
<u>Canis latrans</u>	Coyote	
<u>Castor canadensis</u>	Beaver	
<u>Condylura cristata</u>	Mole, Star-nosed	
<u>Didelphis virginiana</u>	Opossum, Virginia	
<u>Eptesicus fuscus</u>	Bat, Big brown	
<u>Erethizon dorsatum</u>	Porcupine	
<u>Glaucomys volans</u>	Squirrel, Southern flying	
<u>Lasiurus borealis</u>	Bat, Red	
<u>Lasiurus cinereus</u>	Bat, Hoary	
<u>Lepus americanus</u>	Hare, Snowshoe	
<u>Lutra canadensis</u>	Otter, River	
<u>Marmota monax</u>	Woodchuck	
<u>Mephitis mephitis</u>	Skunk, Striped	X
<u>Microtus pennsylvanicus</u>	Vole, Meadow	
<u>Microtus pinetorum</u>	Vole, Woodland	
<u>Mus musculus</u>	Mouse, House	
<u>Mustela ermines cicoqnanii</u>	Ermine	
<u>Mustela frenata</u>	Weasel, Long-tailed	
<u>Mustela vison</u>	Mink	
<u>Myotis lucifugus</u>	Myotis, Little brown	
<u>Napaeozapus insignis</u>	Mouse, Woodland jumping	X
<u>Odocoileus virginianus</u>	Deer, White-tailed	
<u>Ondatra zibethicus</u>	Muskrat	
<u>Parascalops breweri</u>	Mole, Hairy-tailed	
<u>Peromyscus leucopus</u>	Mouse, White-footed	
<u>Peromyscus maniculatus</u>	Mouse, Deer	
<u>Procyon lotor</u>	Raccoon	X
<u>Rattus norvegicus</u>	Rat, Norway	
<u>Scalopus aquaticus</u>	Mole, Eastern	
<u>Sciurus carolinensis</u>	Squirrel, Gray	X
<u>Sorex cinereus</u>	Shrew, Masked	
<u>Sorex dispar</u>	Shrew, Gray Long-tailed	
<u>Sorex fumeus</u>	Shrew, Smoky	

AR302778

Appendix A-2. (continued)

Scientific Name	Common Name	Site Survey
Mammals: (continued)		
<u>Sylvilagus floridanus</u>	Cottontail, Eastern	X
<u>Synaptomys cooperi</u>	Lemming, Southern bog	
<u>Tamias striatus</u>	Chipmunk, Eastern	X
<u>Tamiasciurus hudsonicus</u>	Squirrel, Red	
<u>Urocyon cinereoargenteus</u>	Fox, Gray	
<u>Ursus americanus</u>	Bear, Black	
<u>Vulpes vulpes</u>	Fox, Red	
<u>Zapus hudsonius</u>	Mouse, Meadow jumping	
Reptiles:		
<u>Chelydra serpentina</u>	Turtle, Common snapping	
<u>Chrysemys picta</u>	Turtle, Painted	
<u>Chrysemys picta marginata</u>	Turtle, Midland painted	
<u>Crotalus horridus</u>	Rattlesnake, Timber	
<u>Elaphe obsoleta</u>	Snake, Black rat	
<u>Eumeces fasciatus</u>	Skink, Five-lined	X
<u>Heterodon platyrhinos</u>	Snake, Eastern hognose	
<u>Lampropeltis trianquulum</u>	Snake, Eastern milk	
<u>Nerodia sipedon s.</u>	Snake, Northern water	
<u>Storeria occipitomaculata</u>	Snake, Northern red-bellied	
<u>Terrapene carolina</u>	Turtle, Eastern box	X
<u>Thamnophis sauritus</u>	Snake, Eastern ribbon	
<u>Thamnophis sirtalis</u>	Snake, Common garter	

AR302779

Appendix A-3. Species of Special Concern to known occur in Carbon County, Pennsylvania. List provided by the Pennsylvania Game Commission via the Pennsylvania Fish and Wildlife Database.

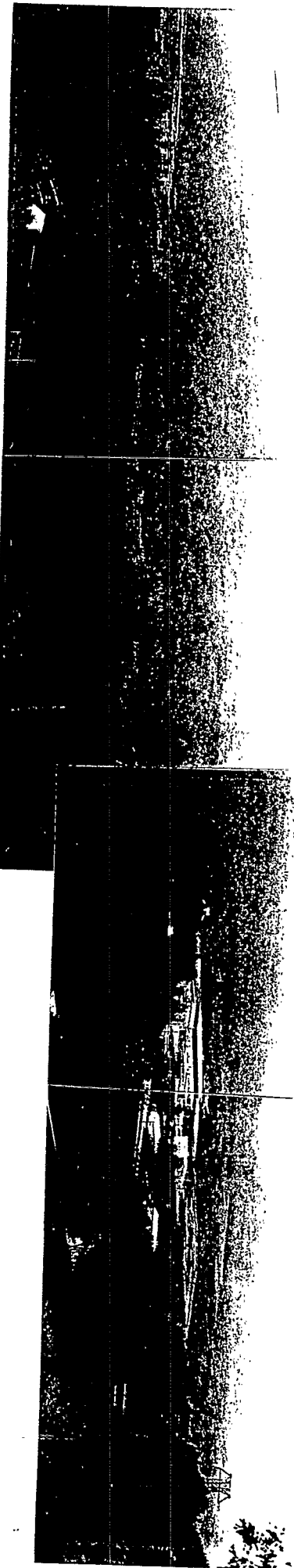
Scientific Name	Common Name	PA Status
<u>Pandion haliaetus</u>	Osprey	Endangered
<u>Accipiter cooperii</u>	Hawk, Cooper's	Special Concern Species
<u>Ammodramus savannarum</u>	Sparrow, Grasshopper	Special Concern Species
<u>Buteo lineatus</u>	Hawk, Red-shouldered	Special Concern Species
<u>Lepus americanus</u>	Hare, Snowshoe	Special Concern Species
<u>Lutra canadensis</u>	Otter, River	Special Concern Species
<u>Progne subis</u>	Martin, Purple	Special Concern Species
<u>Sialia sialis</u>	Bluebird, Eastern	Special Concern Species
<u>Tyto alba</u>	Owl, Common barn	Special Concern Species

AR302780

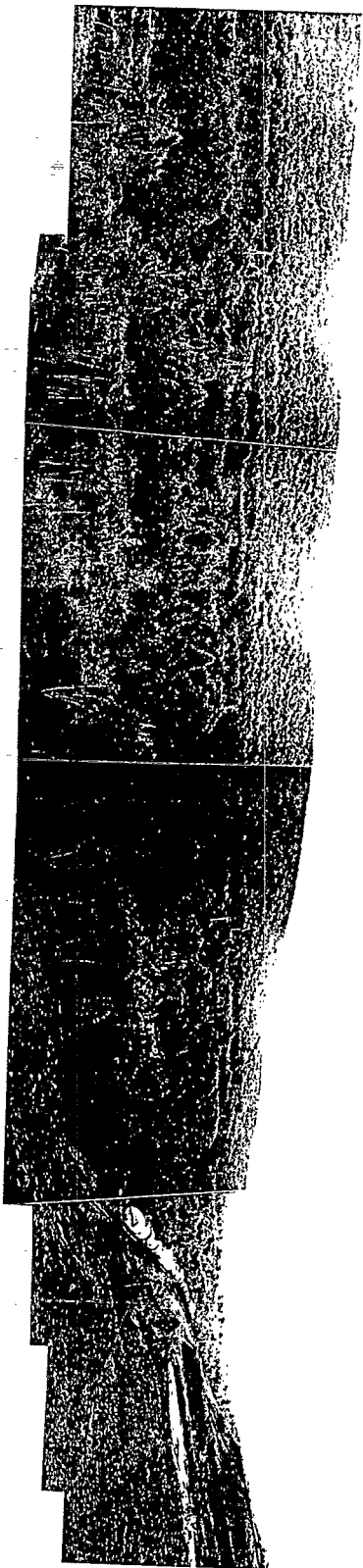
APPENDIX B

Photographs

AR302781

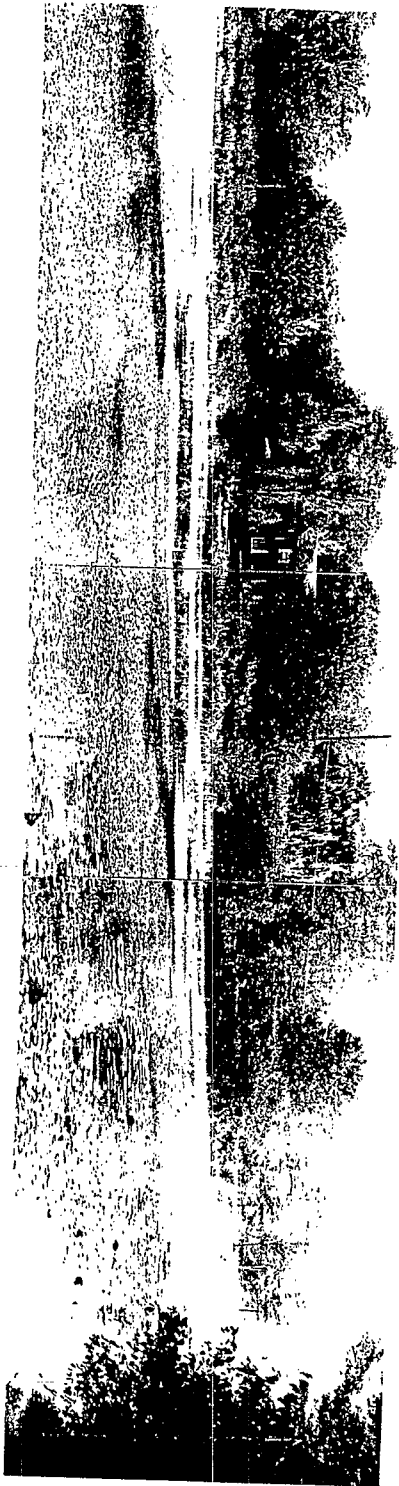
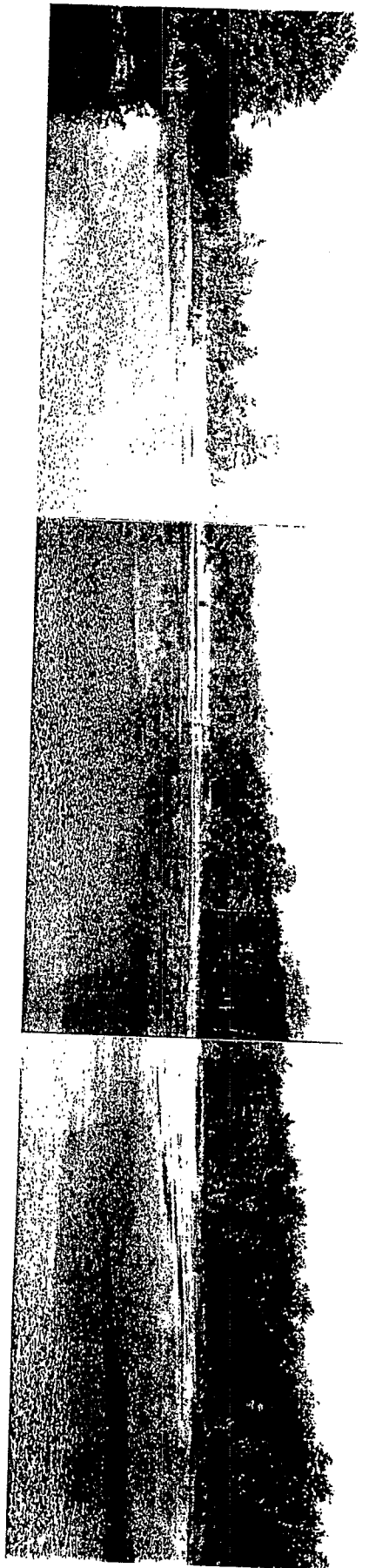


1. West to east panorama of the northern section of the study area taken from the power line right-of-way on Mesquite Mountain in the southern section of the study area. Broad Mountain lies to the north (top) and the cliffs in the mountain to the center and near right are the locations of Bear Run and Demission Run, respectively. Tibbets Pond (far left), the Tomoli Site (near right), coal spoil areas (center and far right), and private residences (lower edge) occupy the center of the study area. The clearcut forest area is shown to the far right north of the coal spoil area.



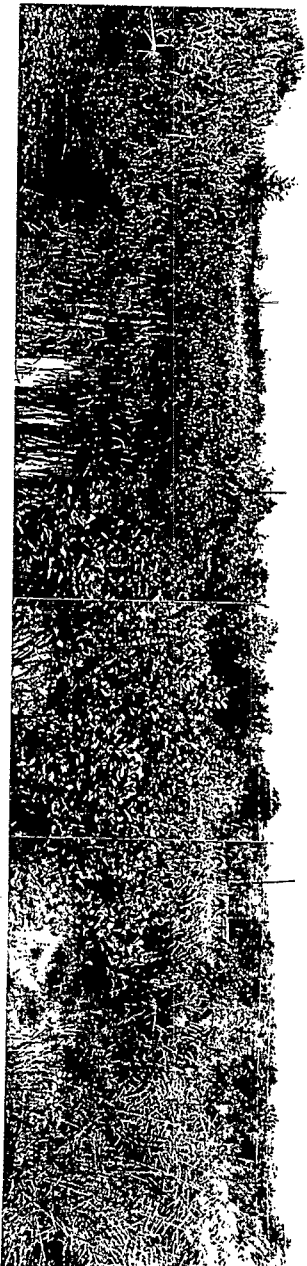
2. East to west panorama of a section of the southern half of the study area taken from the coal spoil area east of the Tomoli Site. Mesquite Mountain lies to the south (top) and is vegetated by deciduous forest. A power line right-of-way (center left) traverses the mountain from east to west. A scrub/shrub community (middle) vegetates the area between the forest and mounded coal spoil (right).

AR302782

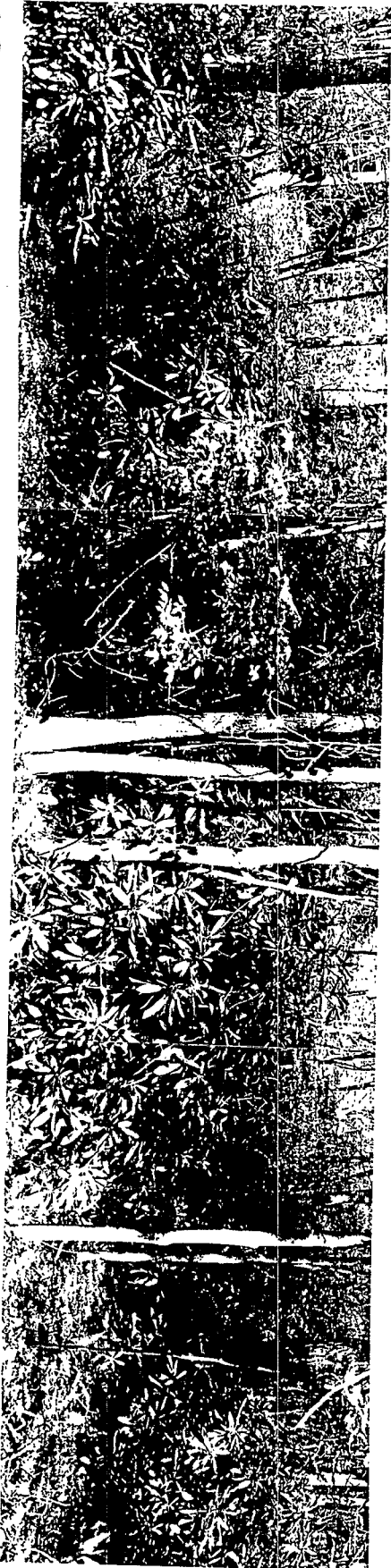


3. Tibbets Pond is vegetated by a dense growth of aquatic macrophytes. Its northern shore (background) is vegetated by a mixed palustrine herbaceous-scrub/shrub wetland community.

AR302783

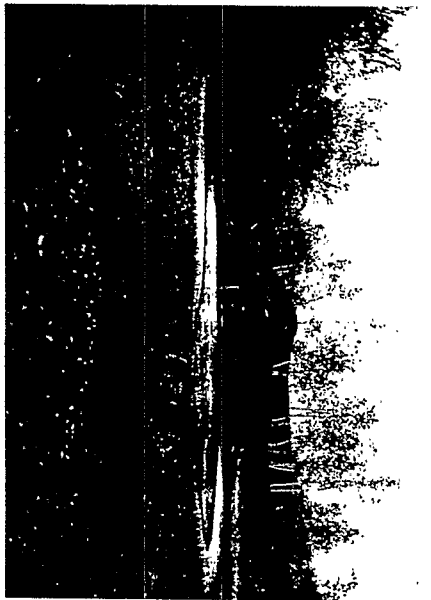


4. A palustrine emergent wetland community located at the western edge of the coal spoil area near Tibbets Pond.



5. The palustrine forested wetland adjacent to Nesquehoning Creek at the eastern edge of the study area is characterized by a dense understory of rhododendron.

AR302784



6. A water-filled depression located in the central-eastern section of the coal spoil area and mapped by the National Wetlands Inventory (NWI) as palustrine, open water, intermittently exposed/permanently flooded, excavated.

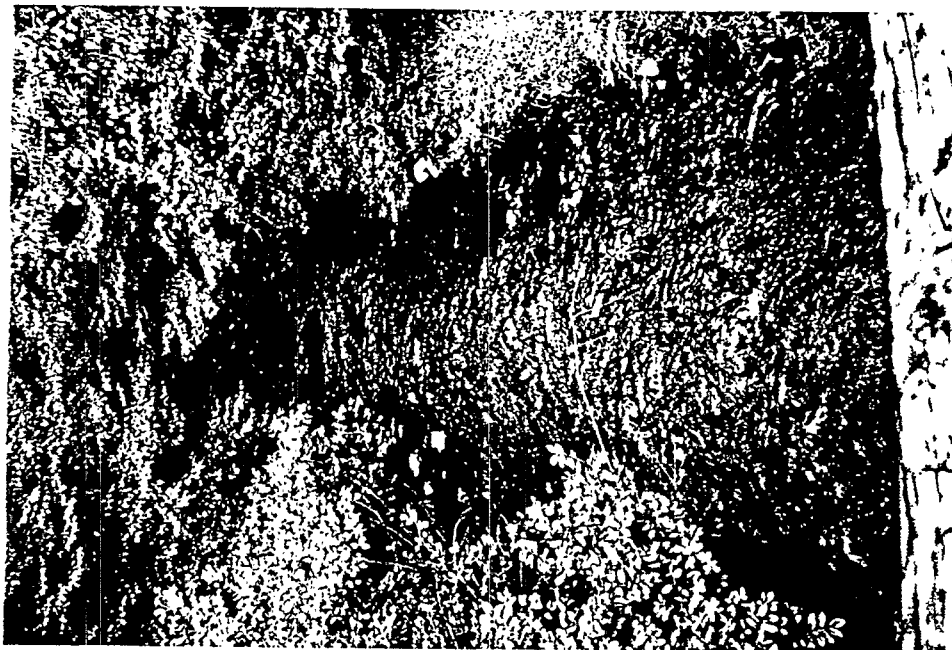


7. The Mesquahoning Creek appears to be channelized throughout most of the central section of the study area and its banks are vegetated by a scrub/shrub community.

AR302785

Surface Water Sampling Stations

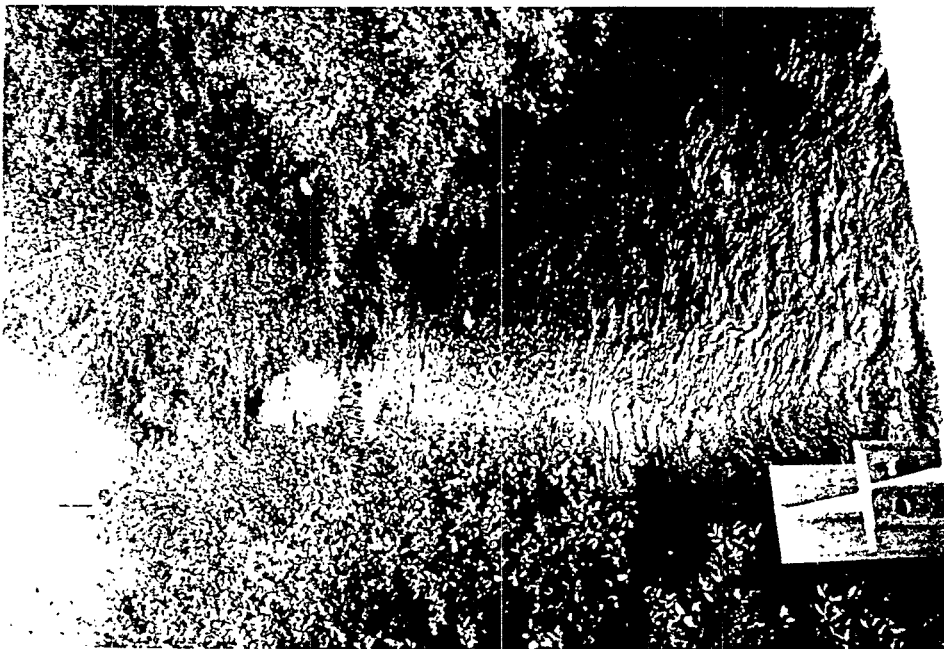
AR302786



1. Station NC-12 Nesquehoning Creek,
facing upstream from bridge.



2. Station NC-13 Nesquehoning Creek,
facing upstream from bridge.



3. Station NC-14 Nesquehoning Creek,
facing upstream from bridge.



4. Station NC-15 Nesquehoning Creek, facing upstream.

AR302788



5. Station NC-16 Nesquehoning Creek, facing upstream from bridge.
Note coal fines along banks.



6. Station NC-17 Nesquehoning Creek, facing upstream.

AR302789



7. Station NC-18 Nesquehoning Creek, facing upstream.



8. Station BE-1 Bear Run, facing downstream.

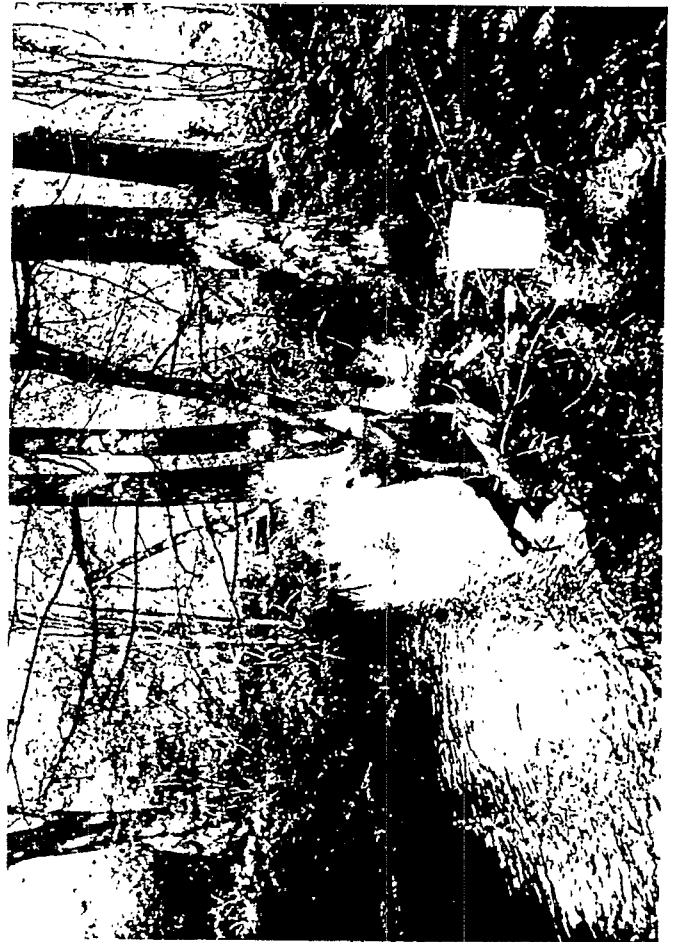
AR302790



9. Station DP-1 Deep Run, facing downstream.



10. Station DN-1 Dennison Run, close up- downstream habitat.



11. Station DN-2 Dennison Run, facing downstream.



12. Station BR-1 Broad Run, facing upstream.

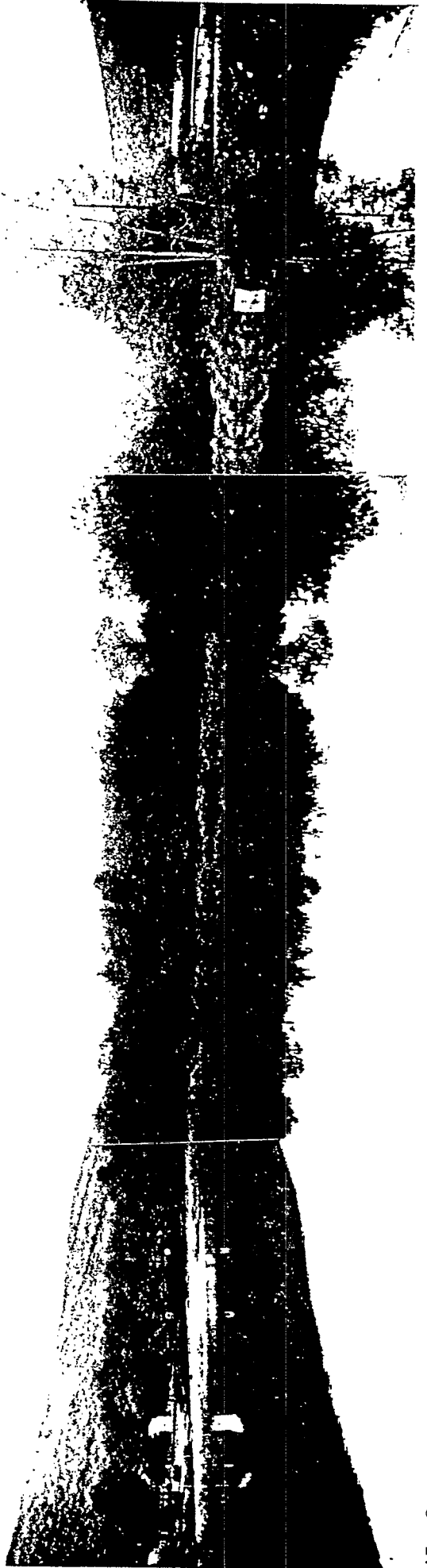
AR302791



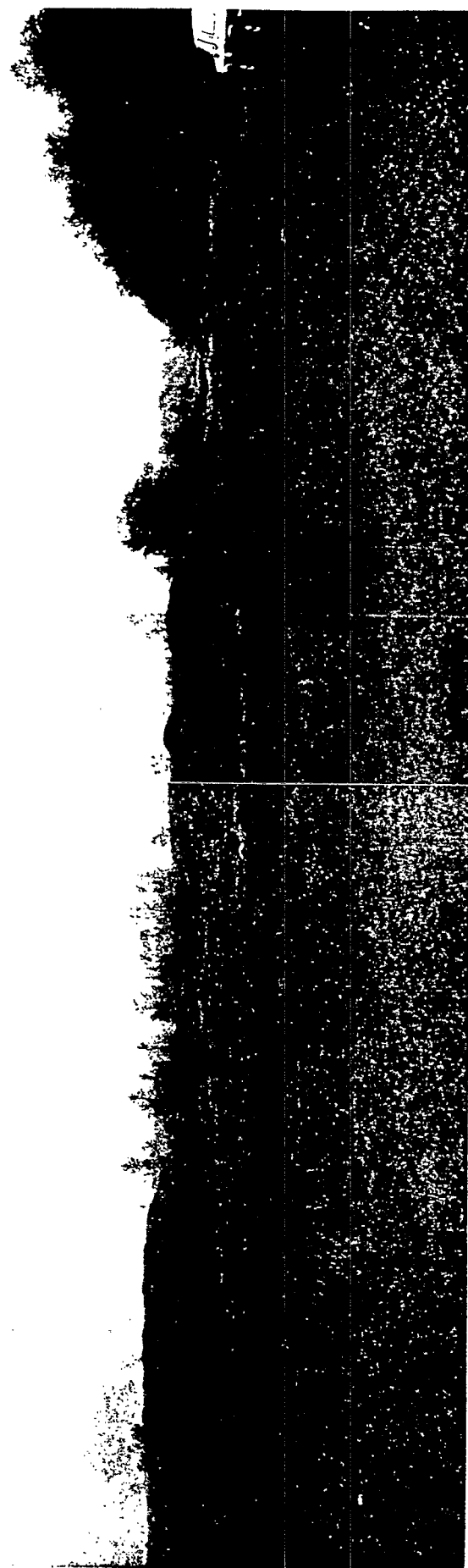
13. Station DP-1 Deep Run, fishes- Brook trout in spawning color.



14. Station PD-1 Pond, fishes from 100' seine haul.

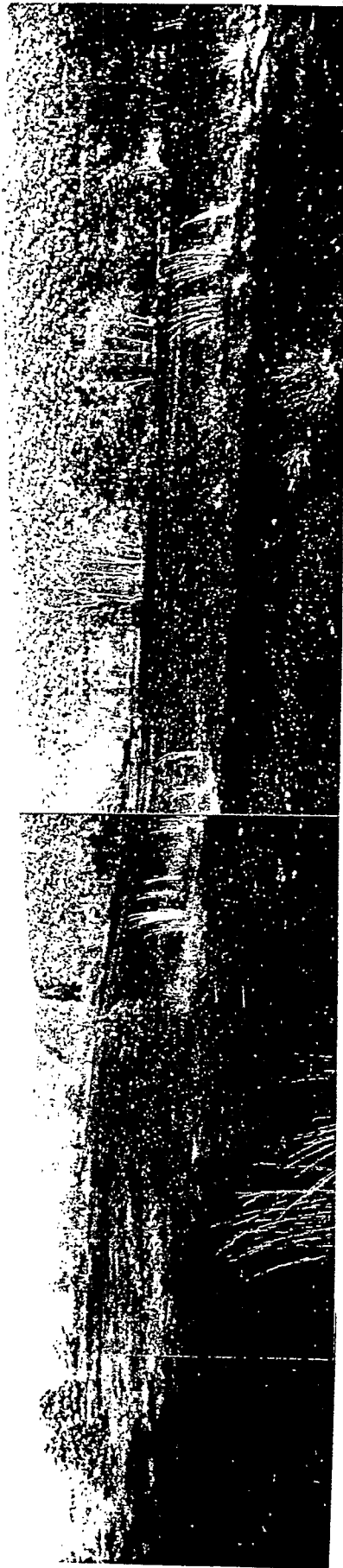


15. Station PD-1 Pond.



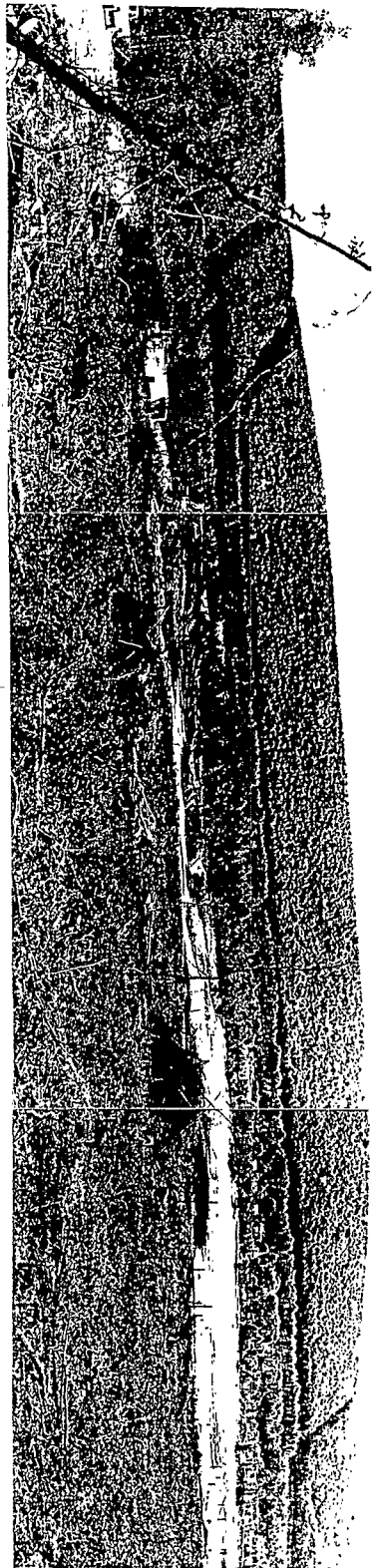
16. and 17. Golf-sport areas in the central portion of the study area largely vegetated by herbaceous, sedge and fern.

AR302793

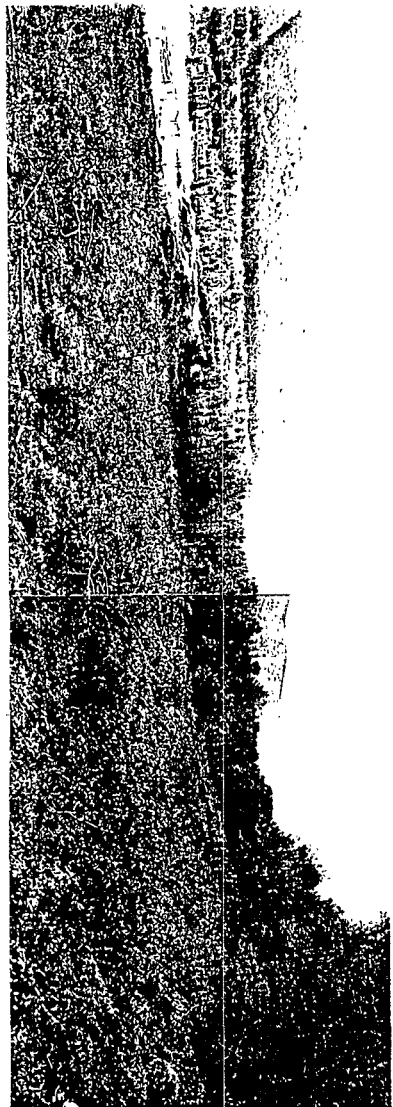


The coal spoil area north of the Tonolli Corporation Site largely vegetated by a scrub/shrub community.

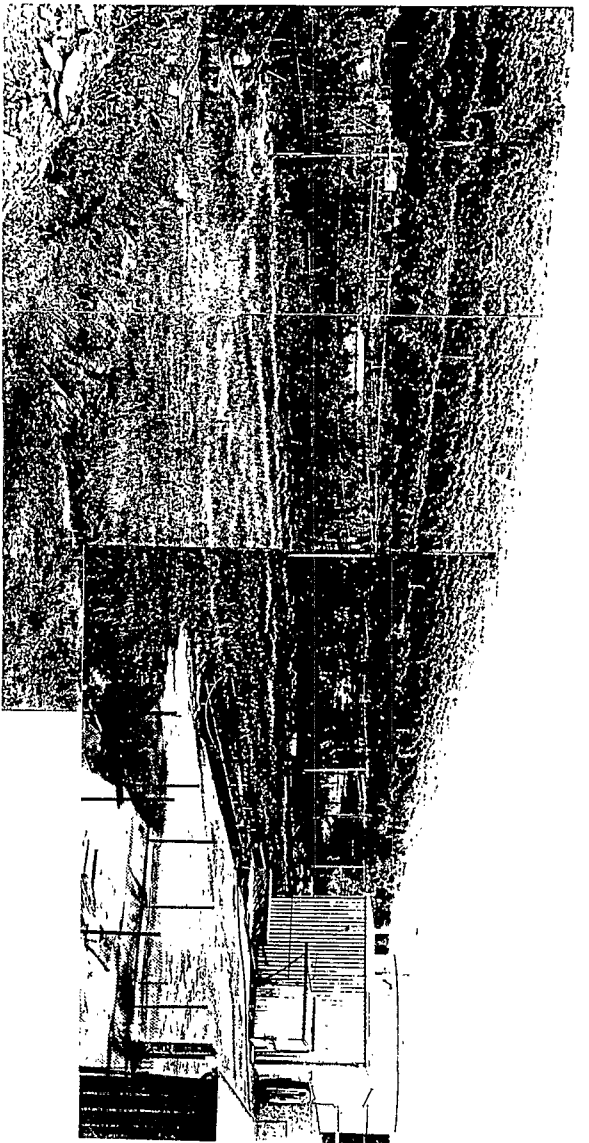
AR302794



17. Clearcut deciduous forest at the base of Broad Mountain - the site of an electric cogeneration station. Denilson Run lies to the left of the dirt road (extreme left) and a large area of mound coal spoil is visible in the center of the photograph. Westquonong Mountain and the power line right-of-way are visible to the south (top).



AR302795



18. The remediated waste lagoon located on the Tonolli Site.



19. A representative view of the deciduous forest which vegetates much of the study area.



20. A representative view of the power line right-of-way which traverses Nequehoning Mountain. This area is characterized by dense patches of New York fern (foreground).

AR302796

APPENDIX C
Coordination Letters

AR30279.7



COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA FISH COMMISSION
Division of Fisheries Management
450 Robinson Lane
Belleville, PA 16823-9616

July 9, 1990

RMC ENVIRONMENTAL SERVICES, Inc.
Keith R. Maurice, Field Biologist
Fricks Lock Road, RD #1
Pottstown, PA 19464

Dear Mr. Maurice:

I have examined the map accompanying your recent correspondence which shows the location for the proposed evaluation of the biota at a site in Mauch Chunk Township, Carbon County, Pennsylvania.

Presently, none of the fishes, amphibians, or reptiles we list as endangered or threatened are known to occur at or in the immediate vicinity of the study area.

Enclosed is some information concerning endangered and threatened species under our jurisdiction and that of the Game Commission.

Sincerely,

Clark N. Shiffer, Coordinator
Herpetology and Endangered Species

mam

Encl.

cc: R. Snyder





COMMONWEALTH OF PENNSYLVANIA

PENNSYLVANIA GAME COMMISSION

2001 ELMERTON AVENUE
HARRISBURG, PA 17110-9797

July 12, 1990

ADMINISTRATIVE BUREAUS

ADMINISTRATIVE787-5670
AUTOMOTIVE AND
PROCUREMENT DIVISION.....787-6594
LICENSE DIVISION.....787-2084
PERSONNEL DIVISION.....787-77
WILDLIFE MANAGEMENT.....787-55
INFORMATION & EDUCATION.....787-6
LAW ENFORCEMENT.....787-5
LAND MANAGEMENT.....787-4
REAL ESTATE DIVISION.....787-65
MANAGEMENT INFORMATION
SYSTEMS.....787-4076

Mr. Keith R. Maurice
RMC Environmental Services
Fricks Lock Road, R.D.#1
Pottstown, PA 19464

Dear Mr. Maurice:

In response to your request for information services, we are providing the enclosed printout from the Pennsylvania Fish and Wildlife Data Base. This information was provided for species occurring in the Tamaqua Quadrangle, Carbon County, Pennsylvania

We have no record of any threatened or endangered bird or mammal occurring on or near your project site. Other specific comments concerning this data search are included on the following page.

The bill for this service is as follows:

Staff Time	7.50
Printing	.80
<u>Mailing Costs</u>	<u>.45</u>
TOTAL	8.75

Please make your reimbursement to the Pennsylvania Game Commission, Division of Wildlife Data Base, 2001 Elmerton Avenue, Harrisburg, PA 17110-9797.

If you have any question or require assistance interpreting this printout, please contact Ms. Bullock or Mr. Hardisky at (717) 787-1570.

Very truly yours,


Jacob I. Sitlinger, Director
Bureau of Land Management

An Equal Opportunity Employer

AR302799

Pennsylvania Fish and Wildlife Data Base

The following species information was generated from the Pennsylvania Fish and Wildlife Data Base for your use in determining species likely to occur in your project area.

This information was provided upon request and should not be viewed as an official review or opinion of the Pennsylvania Game Commission. Species lists generated for this request should be viewed as likely or probable occurrence that might warrant further investigation. These lists are based upon known, documented occurrence within the counties, watershed, land use and habitat types specified in your request.

Information pertaining to aquatic vertebrates and invertebrates contained in these lists is based solely on literature sources and expert opinion. Use of the aquatic species information contained in this report should be coordinated with the Pennsylvania Fish Commission for compliance with their standards and data sources.

This report does not contain information on plants. For information on plant species in your project area, please contact the Pennsylvania Department of Environmental Resources.

Note: Bird species occurrence is based upon recorded sightings and may not imply nesting activity or year-round residence.

Specific Comments/Interpretation

Although we have no record of threatened or endangered birds or mammals in your project area, we cannot conclude that none exist there without an on-site investigation. Threatened and endangered species printed on the county list include species which may accidentally occur but do not nest or rear young at your site. A list of all species occurring in the county is included. However, the fish, amphibian, and reptile lists are currently incomplete.

AR302800

Pennsylvania Fish and Wildlife Data Base
Endangered and Threatened Species List
10 JUL 1990

* Tamaqua Quadrangle *

Common Name..... Scientific Name..... PA Status.....

ZERO Records Listed

Pennsylvania Fish and Wildlife Data Base
Endangered, Threatened, and Special Concern Species List
10 JUL 1990

* Carbon County *

Common Name..... Scientific Name..... PA Status.....

OSPREY	PANDION HALIAETUS	Endangered
--------	-------------------	------------

BLUEBIRD, EASTERN	SIALIA SIALIS	Special Concern Species
HAWK, COOPER'S	ACCIPITER COOPERII	Special Concern Species
HAWK, RED-SHOULDERED	BUTEO LINEATUS	Special Concern Species
MARTIN, PURPLE	PROGNE SUBIS	Special Concern Species
OWL, COMMON BARN	TYTO ALBA	Special Concern Species
SPARROW, GRASSHOPPER	AMMODRAMUS SAVANNARUM	Special Concern Species
HARE, SNOWSHOE	LEPUS AMERICANUS	Special Concern Species
OTTER, RIVER	LUTRA CANADENSIS	Special Concern Species

Pennsylvania Fish and Wildlife Data Base
County Species List
10 JUL 1990

* Carbon County *

Common Name..... Scientific Name.....

BASS, LARGEMOUTH
BASS, ROCK
BASS, SMALLMOUTH
BLUEGILL
BULLHEAD, BROWN
BULLHEAD, YELLOW
CARP, COMMON
CATFISH, CHANNEL
CRAPPIE, BLACK
DARTER, SHIELD
DARTER, TESSELLATED
EEL, AMERICAN
MADTOM, MARGINED
MINNOW, CUTLIPS
MUDMINNOW, EASTERN
PERCH, YELLOW
SUCKER, WHITE
SUNFISH, GREEN
SUNFISH, REDBREAST
TROUT, BROOK
TROUT, BROWN
TROUT, RAINBOW
WALLEYE

MICROPTERUS SALMOIDES
AMBLOPLITES RUPESTRIS
MICROPTERUS DOLOMIEUI
LEPOMIS MACROCHIRUS
ICTALURUS NEBULOSUS
ICTALURUS NATALIS
CYPRINUS CARPIO
ICTALURUS PUNCTATUS
POMOXIS NIGROMACULATUS
PERCINA PELTATA
ETHEOSTOMA OLMSTEDI
ANGUILLA ROSTRATA
NOTURUS INSIGNIS
EXOGLOSSUM MAXILLINGUA
UMBRA PYGMAEA
PERCA FLAVESCENS
CATOSTOMUS COMMERSONI
LEPOMIS CYANELLUS
LEPOMIS AURITUS
SALVELINUS FONTINALIS
SALMO TRUTTA
SALMO GAIRDNERI
STIZOSTEDION VITREUM

BULLFROG
FROG, NORTHERN CRICKET
FROG, UPLAND CHORUS
LONGTAIL SALAMANDER
NEWT, EASTERN
NEWT, RED-SPOTTED
PEEPER, NORTHERN SPRING
SALAMANDER, JEFFERSON
SALAMANDER, MARBLED
SALAMANDER, MOUNTAIN DUSKY
SALAMANDER, NORTHERN DUSKY
SALAMANDER, NORTHERN RED
SALAMANDER, NORTHERN SPRING
SALAMANDER, NORTHERN TWO-LINED
SALAMANDER, REDBACK
SALAMANDER, SLIMY
SALAMANDER, SPOTTED
TOAD, FOWLER'S

RANA CATESBEIANA
ACRIS CREPITANS
PSEUDACRIS TRISERIATA FERIARUM
EURYCEA LONGICAUDA
NOTOPHTHALMUS VIRIDESCENS
NOTOPHTHALMUS VIRIDESCENS VIRIDESCENS
HYLA CRUCIFER
AMBYSTOMA JEFFERSONIANUM
AMBYSTOMA OPACUM
DESMOGNATHUS OCHROPHAEUS
DESMOGNATHUS FUSCUS FUSCUS
PSEUDOTRITON RUBER RUBER
GYRINOPHILUS PORPHYRITICUS PORPHYRITICU
EURYCEA BISLINEATA
PLETHODON CINEREUS
PLETHODON GLUTINOSUS
AMBYSTOMA MACULATUM
BUFO WOODHOUSEI FOWLERI

RATTLESNAKE, TIMBER
SKINK, FIVE-LINED

CROTALUS HORRIDUS
EUMECES FASCIATUS

Pennsylvania Fish and Wildlife Data Base
County Species List
10 JUL 1990

* Carbon County *

Common Name..... Scientific Name.....

SNAKE, BLACK RAT	ELAPHE OBSOLETA
SNAKE, COMMON GARTER	THAMNOPHIS SIRTALIS
SNAKE, EASTERN HOGNOSE	HETERODON PLATYRHINOS
SNAKE, EASTERN MILK	LAMPROPELTIS TRIANGULUM
SNAKE, EASTERN RIBBON	THAMNOPHIS SAURITUS
SNAKE, NORTHERN RED-BELLIED	STORERIA OCCIPITOMACULATA
SNAKE, NORTHERN WATER	NERODIA SIPEDON SIPEDON
TURTLE, COMMON SNAPPING	CHELYDRA SERPENTINA
TURTLE, EASTERN BOX	TERRAPENE CAROLINA
TURTLE, MIDLAND PAINTED	CHRYSEMYS PICTA MARGINATA
TURTLE, PAINTED	CHRYSEMYS PICTA
BITTERN, AMERICAN	BOTAURUS LENTIGINOSUS
BLACKBIRD, RED-WINGED	AGELAIUS PHOENICEUS
BLUEBIRD, EASTERN	SIALIA SIALIS
BOBOLINK	DOLICHONYX ORYZIVORUS
BUFFLEHEAD	BUCEPHALA ALBEOLA
BUNTING, INDIGO	PASSERINA CYANEA
BUNTING, SNOW	PLECTROPHENAX NIVALIS
WASBACK	AYTHYA VALISINERIA
CARDINAL, NORTHERN	CARDINALIS CARDINALIS
CATBIRD, GRAY	DUMETELLA CAROLINENSIS
CHAT, YELLOW-BREASTED	ICTERIA VIRENS
CHICKADEE, BLACK-CAPPED	PARUS ATRICAPILLUS
COOT, AMERICAN	FULICA AMERICANA
COWBIRD, BROWN-HEADED	MOLOTHRUS ATER
CREEPER, BROWN	CERTHIA AMERICANA
CROSSBILL, RED	LOXIA CURVIROSTRA
CROSSBILL, WHITE-WINGED	LOXIA LEUCOPTERA LEUCOPTERA
CROW, AMERICAN	CORVUS BRACHYRHYNCHOS
CROW, FISH	CORVUS OSSIFRAGUS
CUCKOO, BLACK-BILLED	COCCYZUS ERYTHROPTALMUS
CUCKOO, YELLOW-BILLED	COCCYZUS AMERICANUS
DICKCISSEL	SPIZA AMERICANA
DOVE, MOURNING	ZENAIDA MACROURA
DOVE, ROCK	COLUMBA LIVIA
DOWITCHER, SHORT-BILLED	LIMNODROMUS GRISEUS
DUCK, RING-NECKED	AYTHYA COLLARIS
DUCK, RUDDY	OXYURA JAMAICENSIS
DUCK, WOOD	AIX SPONSA
DUNLIN	CALIDRIS ALPINA
EAGLE, BALD	HALIAEETUS LEUCOCEPHALUS
EAGLE, GOLDEN	AQUILA CHRYSÆTOS
FALCON, PEREGRINE	FALCO PEREGRINUS TUNDRIUS
FALCON, HOUSE	CARPODacus MEXICANUS
FALCON, PURPLE	CARPODacus PURPUREUS
FLICKER, NORTHERN	COLAPTES AURATUS

Pennsylvania Fish and Wildlife Data Base
County Species List
10 JUL 1990

* Carbon County *

Common Name..... Scientific Name.....

FLYCATCHER, ACADIAN	EMPIDONAX VIRESCENS
FLYCATCHER, ALDER	EMPIDONAX ALNORUM
FLYCATCHER, GREAT CRESTED	MYIARCHUS CRINITUS
FLYCATCHER, OLIVE-SIDED	CONTOPUS BOREALIS
FLYCATCHER, WILLOW	EMPIDONAX TRAILLII
FLYCATCHER, YELLOW-BELLIED	EMPIDONAX FLAVIVENTRIS
GADWALL	ANAS STREPERA
GALLINULE, COMMON	GALLINULA CHLOROPUS
GNATCATCHER, BLUE-GRAY	POLIOPTILA CAERULEA
GOLDENEYE, COMMON	BUCEPHALA CLANGULA
GOLDFINCH, AMERICAN	CARDUELIS TRISTIS
GOOSE, CANADA	BRANTA CANADENSIS
GOOSE, LESSER SNOW	CHEN CAERULESCENS CAERULESCENS
GOSHAWK, NORTHERN	ACCIPITER GENTILIS
GRACKLE, COMMON	QUISCALUS QUISCULA
GREBE, HORNED	PODICEPS AURITUS
GREBE, PIED-BILLED	PODILYMBUS PODICEPS
GREBE, RED-NECKED	PODICEPS GRISEGENA
GROSBEAK, BLUE	GUIRACA CAERULEA
GROSBEAK, EVENING	COCCOTHAUSTES VESPERTINUS
GROSBEAK, ROSE-BREASTED	PHEUCTICUS LUDOVICIANUS
GROUSE, RUFFED	BONASA UMBELLUS
GULL, BONAPARTE'S	LARUS PHILADELPHIA
GULL, HERRING	LARUS ARGENTATUS
GULL, RING-BILLED	LARUS DELAWARENSIS
HARRIER, NORTHERN	CIRCUS CYANEUS
HAWK BROAD-WINGED	BUTEO PLATYPTERUS
HAWK, COOPER'S	ACCIPITER COOPERII
HAWK, RED-SHOULDERED	BUTEO LINEATUS
HAWK, RED-TAILED	BUTEO JAMAICENSIS
HAWK, ROUGH-LEGGED	BUTEO LAGOPUS
HAWK, SHARP-SHINNED	ACCIPITER STRIATUS
HERON, GREEN-BACKED	BUTORIDES STRIATUS
HERON, LITTLE BLUE	FLORIDA CAERULEA
HUMMINGBIRD, RUBY-THROATED	ARCHILOCHUS COLUBRIS
JAY, BLUE	CYANOCITTA CRISTATA
JUNCO, DARK-EYED	JUNCO HYEMALIS
KESTREL, AMERICAN	FALCO SPARVERIUS
KILLDEER	CHARADRIUS VOCIFERUS
KINGBIRD, EASTERN	TYRANNUS TYRANNUS
KINGFISHER, BELTED	CERYLE ALCYON
KINGLET, GOLDEN-CROWNED	REGULUS SATRAPA
KINGLET, RUBY-CROWNED	REGULUS CALENDULA
LARK, HORNED	EREMOPHILA ALPESTRIS PRATICOLA
LONGSPUR, LAPLAND	CALCARIUS LAPPONICUS
LOON, COMMON	GAVIA IMMER
MALLARD	ANAS PLATYRHYNCHOS
MARTIN, PURPLE	PROGNE SUBIS
MEADOWLARK, EASTERN	STURNELLA MAGNA

Pennsylvania Fish and Wildlife Data Base
County Species List
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* Carbon County *

Common Name..... Scientific Name.....

MERGANSER, COMMON
MERGANSER, HOODED
MERLIN
MOCKINGBIRD, NORTHERN
NIGHTHAWK, COMMON
NUTHATCH, RED-BREASTED
NUTHATCH, WHITE-BREASTED
ORIOLE, NORTHERN
ORIOLE, ORCHARD
OSPREY
OVENBIRD
OWL, BARRED
OWL, COMMON BARN
OWL, EASTERN SCREECH
OWL, GREAT HORNED
OWL, LONG-EARED
OWL, NORTHERN SAW-WHET
OWL, SHORT-EARED
PEWEE, EASTERN WOOD
PHALAROPE, RED-NECKED
PARASANT, RING-NECKED
PEEBE, EASTERN
PLOVER, BLACK-BELLIED
PLOVER, LESSER-GOLDEN
PLOVER, SEMIPALMATED
RAIL, VIRGINIA
REDHEAD
REDPOLL, COMMON
REDSTART, AMERICAN
ROBIN, AMERICAN
SANDPIPER, PECTORAL
SANDPIPER, SEMIPALMATED
SANDPIPER, SOLITARY
SANDPIPER, SPOTTED
SANDPIPER, UPLAND
SAPSUCKER, YELLOW-BELLIED
SCAUP, GREATER
SCAUP, LESSER
SCOTER, BLACK
SCOTER, WHITE-WINGED
SHRIKE, LOGGERHEAD
SHRIKE, NORTHERN
SISKIN, PINE
SNIPE, COMMON
SORA
SPARROW, AMERICAN TREE
SPARROW, CHIPPING
SPARROW, FIELD
SPARROW, FOX

MERGUS MERGANSER
LOPHODYTES CUCULLATUS
FALCO COLUMBARIUS
MIMUS POLYGLOTTOS
CHORDEILES MINOR
SITTA CANADENSIS
SITTA CAROLINENSIS
ICTERUS GALBULA
ICTERUS SPURIUS
PANDION HALIAETUS
SEIURUS AUROCAPILLUS
STRIX VARIA
TYTO ALBA
OTUS ASIO
BUBO VIRGINIANUS
OTUS ASIO
AEGOLIUS ACADICUS
ASIO FLAMMEUS
CONTOPUS VIRENS
PHALAROPUS LOBATUS
PHASIANUS COLCHICUS
SAYORNIS PHOEBE
PLUVIALIS SQUATAROLA
PLUVIALIS DOMINICA
CHARADRIUS SEMIPALMATUS
RALLUS LIMICOLA
AYTHYA AMERICANA
CARDUELIS FLAMMEA
SETOPHAGA RUTICILLA
TURDUS MIGRATORIUS
CALIDRIS MELANOTOS
CALIDRIS PUSILLA
TRINGA SOLITARIA
ACTITIS MACULARIA
BATRAMIA LONGICAUDA
SPHYRAPICUS VARIUS
AYTHYA MARILA
AYTHYA AFFINIS
MELANITTA NIGRA
MELANITTA FUSCA
LANIUS LUDOVICIANUS
LANIUS EXCUBITOR
CARDUELIS PINUS
GALLINAGO GALLINAGO
PORZANA CAROLINA
SPIZELLA ARBOREA
SPIZELLA PASSERINA
SPIZELLA PUSILLA
PASSERELLA ILIACA

Pennsylvania Fish and Wildlife Data Base
County Species List
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* Carbon County *

Common Name..... Scientific Name.....

SPARROW, GRASSHOPPER	AMMODRAMUS SAVANNARUM
SPARROW, HENSLOW'S	AMMODRAMUS HENSLOWII
SPARROW, HOUSE	PASSER DOMESTICUS
SPARROW, LINCOLN'S	MELOSPIZA LINCOLNII
SPARROW, SAVANNAH	PASSERCULUS SANDWICHENSIS
SPARROW, SHARP-TAILED	AMMODRAMUS CAUDACUTUS
SPARROW, SONG	MELOSPIZA MELODIA
SPARROW, SWAMP	MELOSPIZA GEORGIANA
SPARROW, WHITE-CROWNED	ZONOTRICHIA LEUCOPHRYS
SPARROW, WHITE-THROATED	ZONOTRICHIA ALBICOLLIS
STARLING, EUROPEAN	STURNUS VULGARIS
SWALLOW, BANK	RIPARIA RIPARIA
SWALLOW, BARN	HIRUNDO RUSTICA
SWALLOW, CLIFF	HIRUNDO PYRRHONOTA
SWALLOW, NORTHERN ROUGH-WINGED	STELGIDOPTERYX SERRIPENNIS
SWALLOW, TREE	TACHYICINETA BICOLOR
SWIFT, CHIMNEY	CHAETURA PELAGICA
TANAGER, SCARLET	PIRANGA OLIVACEA
TANAGER, SUMMER	PIRANGA RUBRA
TEAL, BLUE-WINGED	ANAS DISCORS
TEAL, GREEN-WINGED	ANAS CRECCA
TERN, BLACK	CHLIDONIAS NIGER
TERN, COMMON	STERNA HIRUNDO
THRASHER, BROWN	TOXOSTOMA RUFUM
THRUSH, GRAY-CHEEKED	CATHARUS MINIMUS
THRUSH, HERMIT	CATHARUS GUTTATUS
THRUSH, SWAINSON'S	CATHARUS USTULATUS
THRUSH, WOOD	HYLOCICHLA MUSTELINA
TITMOUSE, TUFTED	PARUS BICOLOR
TOWHEE, RUFOUS-SIDED	PIPILO ERYTHROPHthalmus
TURKEY, WILD	MELEAGRIS GALLOPAVO
VEERY	CATHARUS FUSCESCENS
VIREO, PHILADELPHIA	VIREO PHILADELPHICUS
VIREO, RED-EYED	VIREO OLIVACEUS
VIREO, SOLITARY	VIREO SOLITARIUS
VIREO, WARBLING	VIREO GILVUS
VIREO, YELLOW-THROATED	VIREO FLAVIFRONS
VULTURE, TURKEY	CATHARTES AURA
WARBLER, BAY-BREASTED	DENDROICA CASTANEA
WARBLER, BLACK-AND-WHITE	MNIOTILTA VARIA
WARBLER, BLACK-THROATED BLUE	DENDROICA CAERULESCENS
WARBLER, BLACK-THROATED GREEN	DENDROICA VIRENS
WARBLER, BLACKBURNIAN	DENDROICA FUSCA
WARBLER, BLACKPOLL	DENDROICA STRIATA
WARBLER, BLUE-WINGED	VERMIVORA PINUS
WARBLER, CANADA	WILSONIA CANADENSIS
WARBLER, CAPE MAY	DENDROICA TIGRINA
WARBLER, CERULEAN	DENDROICA CERULEA
WARBLER, CHESTNUT-SIDED	DENDROICA PENNSYLVANICA

Pennsylvania Fish and Wildlife Data Base
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* Carbon County *

Common Name..... Scientific Name.....

WARBLER, GOLDEN-WINGED	VERMIVORA CHRYSOPTERA
WARBLER, HOODED	WILSONIA CITRINA
WARBLER, MAGNOLIA	DENDROICA MAGNOLIA
WARBLER, MOURNING	OPORORNIS PHILADELPHIA
WARBLER, NASHVILLE	VERMIVORA RUFICAPILLA
WARBLER, NORTHERN PARULA	PARULA AMERICANA
WARBLER, PINE	DENDROICA PINUS
WARBLER, PRAIRIE	DENDROICA DISCOLOR
WARBLER, TENNESSEE	VERMIVORA PEREGRINA
WARBLER, WILSON'S	WILSONIA PUSILLA
WARBLER, WORM-EATING	HELMITHEROS VERMIVORUS
WARBLER, YELLOW	DENDROICA PETECHIA
WARBLER, YELLOW-RUMPED	DENDROICA CORONATA
WARBLER, YELLOW-THROATED	DENDROICA DOMINICA
WATERTHRUSH, LOUISIANA	SEIURUS MOTACILLA
WATERTHRUSH, NORTHERN	SEIURUS NOVEBORACENSIS
WAXWING, CEDAR	BOMBYCILLA CEDRORUM
WHIP-POOR-WILL	CAPRIMULGUS VOCIFERUS
WIGEON, AMERICAN	ANAS AMERICANA
WOODCOCK, AMERICAN	SCOLOPAX MINOR
WOODPECKER, DOWNY	PICOIDES PUBESCENS
WOODPECKER, HAIRY	PICOIDES VILLOSUS
WOODPECKER, PILEATED	DRYOCOPUS PILEATUS
WOODPECKER, RED-BELLIED	MELANERPES CAROLINUS
WOODPECKER, RED-HEADED	MELANERPES ERYTHROCEPHALUS
WREN, CAROLINA	THRYOTHORUS LUDOVICIANUS
WREN, HOUSE	TROGLODYTES AEDON
WREN, WINTER	TROGLODYTES TROGLODYTES
YELLOWLEGS, GREATER	TRINGA MELANOLEUCA
YELLOWLEGS, LESSER	TRINGA FLAVIPES
YELLOWTHROAT, COMMON	GEOTHLYPIS TRICHAS BRACHIDACTYLUS

BAT, BIG BROWN	EPTESICUS FUSCUS
BAT, HOARY	LASIURUS CINEREUS
BAT, RED	LASIURUS BOREALIS
BEAR, BLACK	URSUS AMERICANUS
BEAVER	CASTOR CANADENSIS
CHIPMUNK, EASTERN	TAMIAS STRIATUS
COTTONTAIL, EASTERN	SYLVILAGUS FLORIDANUS
COYOTE	CANIS LATRANS
DEER, WHITE-TAILED	ODOCOILEUS VIRGINIANUS
ERMINE	MUSTELA ERMINES CICOGNANII
FOX, GRAY	UROCYON CINEREOARGENTEUS
FOX, RED	VULPES VULPES
FOOT, SNOWSHOE	LEPUS AMERICANUS
SKUNK, SOUTHERN BOG	SYNAPTOMYS COOPERI
MINK	MUSTELA VISON

Pennsylvania Fish and Wildlife Data Base
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Common Name.....	Scientific Name.....
MOLE, EASTERN	SCALOPUS AQUATICUS
MOLE, HAIRY-TAILED	PARASCALOPS BREWERI
MOLE, STAR-NOSED	CONDYLURA CRISTATA
MOUSE, DEER	PEROMYSCUS MANICULATUS
MOUSE, HOUSE	MUS MUSCULUS
MOUSE, MEADOW JUMPING	ZAPUS HUDSONIUS
MOUSE, WHITE-FOOTED	PEROMYSCUS LEUCOPUS
MOUSE, WOODLAND JUMPING	NAPAEOZAPUS INSIGNIS
MUSKRAT	ONDATRA ZIBETHICUS
MYOTIS, LITTLE BROWN	MYOTIS LUCIFUGUS
OPOSSUM, VIRGINIA	DIDELPHIS VIRGINIANA
OTTER, RIVER	LUTRA CANADENSIS
PORCUPINE	ERETHIZON DORSATUM
RACCOON	PROCYON LOTOR
RAT, NORWAY	RATTUS NORVEGICUS
SHREW, GRAY LONG-TAILED	SOREX DISPAR
SHREW, MASKED	SOREX CINEREUS
SHREW, NORTHERN SHORT-TAILED	BLARINA BREVICAUDA
SHREW, SMOKY	SOREX FUMEUS
SKUNK, STRIPED	MEPHITIS MEPHITIS
SQUIRREL, GRAY	SCIURUS CAROLINENSIS
SQUIRREL, RED	TAMIASCIURUS HUDSONICUS
SQUIRREL, SOUTHERN FLYING	GLAUCOMYS VOLANS
VOLE, MEADOW	MICROTUS PENNSYLVANICUS
VOLE, WOODLAND	MICROTUS PINETORUM
WEASEL, LONG-TAILED	MUSTELA FRENATA
WOODCHUCK	MARMOTA MONAX



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Suite 322
315 South Allen Street
State College, Pennsylvania 16801

July 11, 1990

Mr. Keith R. Maurice
Field Biologist
RMC Environmental Services, Inc.
Fricks Lock Road, R.D.#1
Pottstown, PA 19464

Dear Mr. Maurice:

This responds to your letter of June 29, 1990, requesting information concerning the presence of federally listed or proposed endangered and threatened species within the area affected by the proposed Tonnolli site located in Carbon County, Pennsylvania.

Except for occasional transient species, no federally listed or proposed threatened or endangered species under our jurisdiction are known to exist in the project impact area. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered. A compilation of federally listed endangered and threatened species in Pennsylvania is enclosed for your information. Requests for information regarding State-listed endangered or threatened species should be directed to the Pennsylvania Game Commission (wildlife), the Pennsylvania Fish Commission (fish, reptiles and amphibians) and the Pennsylvania Department of Environmental Resources (plants).

This response relates only to endangered or threatened species under our jurisdiction, based on an office review of the proposed project's location. No field inspection of the project area has been conducted by this office. Consequently, this letter is not to be construed as addressing other Service concerns under the Fish and Wildlife Coordination Act or other legislation.

If we can be of further assistance, please contact us.

Sincerely,

Charles J. Kulp
Supervisor

Enclosure

AR302810

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN PENNSYLVANIA

COMMON NAME	SCIENTIFIC NAME	STATUS	DISTRIBUTION
<u>FISHES:</u>			
Sturgeon, shortnose*	<u>Acipenser brevirostrum</u>	E	Delaware River and Other Atlantic Coastal waters
<u>REPTILES:</u>			
NONE			
<u>BIRDS:</u>			
Eagle, bald	<u>Haliaeetus leucocephalus</u>	E	Entire State
Falcon, American peregrine	<u>Falco peregrinus anatum</u>	E	Entire State - re-establishment to former breeding range in progress
Falcon, Arctic	<u>Falco peregrinus tundrius</u>	E	Entire State migratory - no nesting
<u>MAMMALS:</u>			
Bat, Indiana	<u>Myotis sodalis</u>	E	Entire State
Cougar, Eastern	<u>Felis concolor cougar</u>	E	Entire State - probably extinct
<u>MOLUSKS:</u>			
NONE			
<u>PLANTS:</u>			
Pogonia, small whorled	<u>Isotria medeoloides</u>	E	Becks, Centre, Chester, Greene, Monroe, Montgomery, Philadelphia & Venango Counties

* Principal responsibility for this species is vested with the National M.A. Fisheries Service.

Region 5 6/3/85 - 1 p.

AR302811

MEETING / PHONE CALL RECORD

☒ Telephone Conversation ☐ Personal Meeting

Date 7 / 2 / 90

Name Dan Bourke

Time app. 2:00 XXX PM

Company PA Fish Commission

☒ Originator Placed Call

Address _____

☐ Originator Received Call

Title: Fisheries Technician

JOB NO. 3759

Phone (717) 588-6388

LOCATION _____

Subject Tonolli site streams

Notes: Dan is an assistant to Dave Arnold, Area Fisheries Manager. Dave is on vacation and will return 7/11. He has worked within his position for at least 10 years and during that time, no work was conducted on the Nesquehoning Creek or its tributaries near the Tonolli Site. He said that either all the land in the watershed is private or the streams are too small to survey.

A good time to reach Dave is approximately 8:30 a.m.

☐ File _____

Follow-Up-Action: None

☐ Tickle File _____ / _____ / _____

☐ Follow-Up By: _____

☐ Copy/Route To: CED/GTP/WSE

Originator's Initials WSE

AR302812

MEETING / PHONE CALL RECORD

☒ Telephone Conversation ☐ Personal Meeting

Date 12 / 3 / 90

Name Dave Arnold

Time 1120 AM/PM

Company PA Fish Commission

☒ Originator Placed Call

Address Fisheries Management Area #5

☐ Originator Received Call

Bushkill, PA 18324

JOB NO. 3759-03

Phone (717)588-6388

LOCATION _____

Subject Tonolli RIFS Ecological Characterization - Surface Water

Notes:

Question: Is there any fishing pressure on tributaries to Nesquehoning Creek
in upper reaches near Hauto Reservoir?

Answer: Have no information detailing pressure in that area.

Question: Is there any fishing in the ponds or reservoirs in that area?

Answer: Have no information. If these are privately owned impoundments
(Hauto and pond are) they would not be under evaluation by the
Pennsylvania Fish Commission.

Will send copy of fish sampling results and map to Dave for his information.

☐ File _____

Follow-Up-Action: _____

☐ Tickle File _____ / _____ / _____

☐ Follow-Up By: _____

☐ Copy/Route To: _____

Originator's Initials _____

AR302813

MEETING / PHONE CALL RECORD

☒ Telephone Conversation ☐ Personal Meeting

Date 12 / 28 / 90

Name Wayne Alfano

Time approx. 11:45 AM ~~PM~~

Company Waterways Conservation

☐ Originator Placed Call

Address Officer - Carbon County

☒ Originator Received Call

PA Fish Commission

JOB NO. 3759-03

Phone _____

LOCATION _____

Subject Recreational fishing in the vicinity of the Tonolli Site

Notes: There is no recreational fishing in Nesquehoning Creek in the vicinity of
the Tonolli Site. The fish community is almost non-existent.

In the pond located near the confluence of Broad Run and Nesquehoning Creek,
there may be recreational fishing by children. However, he hasn't seen any.

Fishermen may walk down to Tibbets Pond from Hauto Dam and fish there.

There is quite a bit of recreational fishing in Lake Hauto by residents and
people with permits issued by the Lake Hauto Association. He knows that the
Association has stocked rainbow trout in past years. There is ice fishing in
Lake Hauto.

☐ File _____

Follow-Up-Action: _____

☐ Tickle File _____ / _____ / _____

☐ Follow-Up By: _____

☐ Copy/Route To: _____

Originator's Initials WSE

AR302814

MEETING / PHONE CALL RECORD

☒ Telephone Conversation ☐ Personal Meeting

Date 12 / 4 / 90

Name Richard Carper WCO

Time 5:15 AM/PM

Company PA Game Commission

☐ Originator Placed Call

Address NE Regional Office, Carbon District,

☒ Originator Received Call

P.O. Box 220, Dallas, PA 18612

JOB NO. 3759/03

Phone (717)675-1143

LOCATION _____

Subject Hunting Pressure in the Vicinity of the Tonolli Property.

Notes: Kovatch property north of site gets average to high pressure during both
archery and gun season for deer. Small game season pressure is low due to
lack of pheasants; however, some rabbit hunting occurs in and around coal
culm area northeast of site. Geese and ducks are hunted on Lake Hauto and
Tibbets Pond.

Lake Hauto Dam is a popular fishing area.

☒ File 3759

Follow-Up-Action: _____

☐ Tickle File _____ / _____ / _____

☒ Follow-Up By: KJH

☒ Copy/Route To: KJH, GAR, WSE

Originator's Initials KRM

AR302815

MEETING / PHONE CALL RECORD

☒ Telephone Conversation ☐ Personal Meeting

Date 12 / 11 / 90

Name Kathy McKenna, Coordinator Inventory

Time 9:00 AM/PM

Company Pennsylvania Natural Diversity

☒ Originator Placed Call

Address PaDER Bureau of Forestry
Forest Advisory Services

☐ Originator Received Call

P.O. Box 1467, Harrisburg, PA 17120

JOB NO. 3759

Phone (717) 787-3444

LOCATION _____

Subject _____

Notes: A review of PNDI database for the Tamaqua and Nesquehoning USGS Quadrangles
revealed no Pennsylvania listed Species of Special Concern with a one-half mile
radius of Tonolli Corporation Site.

☒ File 3759

Follow-Up-Action: _____

☐ Tickle File _____ / _____ / _____

☐ Follow-Up By: _____

☒ Copy/Route To: WSE, GAR, KJH

Originator's Initials KRM

AR302816



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES

Bureau of Water Quality Management
Wilkes-Barre Regional Office
90 East Union Street - 2nd Floor
Wilkes-Barre, PA 18701-3296
(717) 826-2330 or (717) 826-2553

July 24, 1990

Mr. George T. Potera
RMC Environmental Services, Inc.
Fricks Lock Road, R. D. #1
Pottstown, PA 19464

RE: Request for File Search
Nesquehoning Creek

Dear Mr. Potera:

In response to your June 20, 1990 letter to Mr. John J. Wilkes, Jr., requesting permission to review the DER files on (a) Nesquehoning Creek and (b) the Tonolli site, I have enclosed all of the stream data we have in our files on Nesquehoning Creek, Carbon County, in the vicinity of the Tonolli site. There may be additional information on the effluent quality and/or permit limits and modeling in the permit files. If you feel you would like access to this information, please give me a call to set up an appointment.

Very truly yours,

Edward P. Kupsy
Water Pollution Biologist

Enclosures

AR302817

Reg. Biol.

500

Reading Regional Office
Wernersville, PA 19565
8-474-3458

March 4, 1981

Subject: Aquatic Biology Investigation
Nesquehoning Creek
Carbon County
June 5, 1980

Thru: Water Quality Regional
Operations Manager

To: Charles H. Kuder
Chief, Planning Section

From: Peter D. Bronner *PEB*
Water Pollution Biologist

Introduction and Summary of Results

At your request, I conducted an investigation on Nesquehoning Creek on June 5, 1980. The purpose of the investigation was to evaluate the impact of sewage discharges from the Borough of Nesquehoning on aquatic life in the stream. I was assisted in the field by Robert Frey and Richard Shertzner, biologists with the Division of Water Quality.

Little conclusive information regarding the effects of Nesquehoning Borough sewage on aquatic organisms was found. The stream exhibits a low pH throughout the study area, caused by coal mine refuse drainage, which prevented the formation of any normal aquatic communities. Sewage downstream of the Borough was present as visible solids, detectable odor, and measurable but slight changes in water analyses.

A more detailed report of the survey follows.

Methods

The stream was observed primarily at two sampling stations downstream and one station upstream of the populated area of Nesquehoning. The stations were centered on riffle areas and their locations are listed in Table I. Included in Table I is the location of a station labeled 1B, at which sampling was terminated in favor of a location farther upstream (1A) because of an unusual rarity of macroinvertebrate organisms at 1B. Benthic invertebrates were collected at each station by capture on kick screen and by rock picking until no new forms appeared. Specimens were preserved and returned to the Regional Office where I identified them using standard taxonomic references. The taxa found are reported in Table II. Water samples for physical, chemical, and bacteriological analyses by the Bureau of Laboratories in Harrisburg were collected at Stations 1A, 2, and 3. Temperature, pH, dissolved oxygen, and specific conductance were measured in the field, and the results of all analyses are given in Table III. Stream physiography recorded in the field is reported in Tables IV and V.

AR302818

Interpretation of Results

Stations are addressed in downstream order.

Station 1: Nesquehoning Creek; about two miles upstream of populated area of Nesquehoning Borough; about 150 yards upstream of confluence with Broad Run.

The invertebrate collection contained 13 taxa dominated by tolerant midge larvae, the only abundant group found. All of the remaining taxa were transients, having appeared as one or two individuals washed in from less depressed areas upstream. The primary reason for this depressed community was an acid condition (pH 4.5 measured). The acid appears to originate from leaching of coal refuse on the watershed. If that is the source it is possible that one or more of several heavy metals were present in elevated concentrations. Total iron was elevated at 0.94 mg/l.

Station 2: Nesquehoning Creek; about 200 yd. west of Pa. Rt. 93, just downstream of populated areas of Nesquehoning Borough.

The invertebrate collection from this station was slightly depressed even below that of Station 1. Nine taxa dominated by tolerant midges and fishfly larvae (hellgrammites) were found, and not even a single transient individual of any pollution sensitive species was found. The stream was well aerated and turbulent but some coal silt was trapped in the subsale, especially on algae-covered rocks. The stream also carried readily observable sewage solids and released the odor of untreated sewage. Water sample analysis revealed slight increases in dissolved solids, biochemical oxygen demand, nitrite and nitrate nitrogen, chloride, phosphorous, and fecal coliform bacteria, all attributable to sewage discharges. It is likely that the slight increase in nitrate nitrogen originates with the Saran Lighting sewage treatment plant discharge, at the upstream end of Nesquehoning; of the remaining changes, an increase in pH and decreases in iron and ammonia are attributed to dilution by confluence with five small tributaries (Broad Run, Deep Run, and three unnamed tributaries). Increases in dissolved solids, biochemical oxygen demand, fecal coliforms, and chloride are due to Nesquehoning sewage discharge.

The dominant condition limiting water quality remained the low pH. The sewage discharges act as a secondary influence in slightly depressing the aquatic community further.

Station 3: Nesquehoning Creek; just upstream of confluence with Lehigh Coal and Navigation mine discharge; about 1.7 miles downstream of Pa. Rt. 93 bridge.

A slight improvement in invertebrate diversity to 16 taxa was highlighted by the reappearance of several transient pollution sensitive taxa. Nevertheless, the community remained depressed and resembled that of 1A. Fishfly larvae (hellgramites) and ridge larvae were abundant and these pollution tolerant forms dominated the collection.

A minor peculiarity in water chemistry, wherein several sewage-related parameters exceeded levels at Station 2, is explained as follows. Station 3 was sampled at about 11:00 AM, an hour before Station 2. The peak morning sewage flow from Nesquehoning should have still been present, allowing estimated time of downstream travel, at Station 3 coincident with sampling. When sampling over an hour later and farther upstream at Station 2, however, peak sewage flow would be well past and sewage parameters would appear less distinctly. At Station 3, biochemical oxygen demand, total organic carbon, ammonia nitrogen, and methylene blue active substances were all slightly elevated above levels at Station 2.

Conclusions

1. The aquatic community in Nesquehoning Creek is depressed throughout the study area due primarily to low stream pH.
2. Nesquehoning Borough sewage discharges cause degradation in Nesquehoning Creek beyond that caused by upstream sources. The additional depression of the invertebrate community is small because of the severity of effects of pollutants from upstream sources. The presence of sewage downstream is measurable and visually observable.
3. Nesquehoning Creek derives benefit by confluence with several high quality mountain watershed tributaries. The benefit comes in the form of dilution which moderates the water quality effects caused by pollutional discharges.

CEE:46

cc: Robert Frey
Joseph Standa
Regional Biologist
Stream File 1.19.5R
John Nappero, US EPA - Phila.

AR302820

AQUATIC BIOLOGICAL INVESTIGATION

Macroinvertebrates

Relative abundance abbreviations defined at end

Table: II

Name of Stream: Nesquehoning Creek

County: Carbon County

Date: June 5, 1980

Taxa	Stations					
	1A	1B	2	3		
<u>COLEOPTERA (Beetles)</u>						
Gyrinidae						
Dytiscidae(Predaceous Diving Beetles)						
<u>Agabus</u>	X		R	X		
<u>Copelatus</u>				X		
Psephenidae						
Elmidae						
Halplidae						
Hydrophilidae						
Dryopidae						
Limnichidae.....						
<u>DIPTERA (Two Winged Flies)</u>						
Tipulidae						
Simuliidae(Blackflies).....						
<u>Simulium</u>	X					
Chironomidae(Midges).....	A		C	A		
<u>Cardiocladius</u>	X		X(2)	X(2)		
<u>Cricotopus</u>	X(2)	X	X(2)	X		
<u>Eukiefferiella</u>	X			X		
<u>Pentaneura</u>	X			X		
<u>Polypedilum</u>	X	X	C	R		
<u>Chironomus</u>	C	X				
Ceratopogonidae						
Tabanidae						
Rhagionidae						
Empididae						
Ephydriidae						
Anthomyiidae						
Pychodidae						
Stratomyiidae.....						
<u>HELEIDAE (Biting Midges)</u>						
<u>Palpomyia</u>		X	X			
<u>PSYCHODIDAE (Noth Flies)</u>			X			
NUMBER OF TAXA AT STATION	13	6*	9	16		

Relative abundance abbreviations:

A - abundant

C - common

R - rare

X - present, abundance information inconclusive

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AQUATIC BIOLOGICAL INVESTIGATION

Macroinvertebrates

Relative abundance abbreviations defined at end

Table: II

Name of Stream: Nesquehoning Creek

County: Carbon County

Date: June 5, 1980

Taxa	Stations					
	1A	1B	2	3		
<u>ODONATA (Dragonflies, Damselflies)</u>						
<u>Anisoptera</u>						
Gomphidae						
Libellulidae						
Cordulegasteridae						
Aeschnidae.....						
<u>Zygoptera</u>						
Coenagrionidae						
Agriidae.....						
<u>HEMIPTERA (Bugs)</u>						
Corixidae						
Gerridae						
Notonectidae						
Belostomatidae.....						
<u>HYDRACARINA (Water Mites)</u>						
<u>MEGALOPTERA (Alderflies,</u>						
<u>Dobsonflies,</u>						
<u>Fishlies)</u>						
Sialidae						
<u>Sialis</u>	X			R-C		
Corydalidae.....						
<u>Chauliodes</u>	R		C	A		
<u>TRICHOPTERA (Caddisflies)</u>						
Hydroptilidae						
Helicopsychidae						
Rhyacophilidae						
<u>Rhyacophila</u>				R		
Limnephilidae						
Hydropsychidae						
<u>Hydropsyche</u>	X					
<u>Diplectrona</u>		X				
Philopotamidae						
Psychomyiidae						
Leptoceridae						
Tachycentridae						
Glossosomatidae						
<u>Glossosoma</u>				R		
Phryganeidae.....						

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AQUATIC BIOLOGICAL INVESTIGATION

Macroinvertebrates

Relative abundance abbreviations defined at end

Table: II

Name of Stream: Nesquehoning Creek

County: Carbon County

Date: June 5, 1920

(continued)

A number in parenthesis follow the relative abundance abbreviation, e.g. X(2), refers to the number of species noted within that taxon at that station.

*Sampling was terminated prematurely at Station 1B, because of the extreme paucity of macroinvertebrates, and restarted at Station 1A.

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Table: III

Name of Stream: Nesquehoning Creek

County: Carbon

Date: June 5, 1980

AQUATIC BIOLOGICAL INVESTIGATION

Water Chemistry Data

Parameter	1A	2	3	Stations
Temperature °C (Field)	19.6	16.5	13.8	
pH (Field) standard units.....	5.1	5.9	5.9	
Dissolved Oxygen (Field)	9.0	10.4	10.3	
Appearance				
Color				
Odor				
Turbidity (J.C.U.)				
pH (Lab) standard units.....	4.5	4.7	4.7	
Alkalinity (ppm CaCO ₃)	4	4	4	
pH ₄ (Total Acidity)				
pH ₈ (Total Hot Acidity)				
Fe Total .....	.94	.59	.39	
SO ₄	35	35	25	
Mn .....	.35	.43	.34	
Cumulative Conductance (Micromhos/cm)	130	150	140	
Total Solids Dissolved Solids	92	110	96	
Volatile				
Fixed				
Suspended Solids				
Volatile				
Fixed				
Settleable Solids TOC	5.0	<1.0	2.0	
B.O.D.	0.8	1.6	2.0	
NO ₂ -N .....	.004	.008	.006	
NO ₃ -N .....	.06	.17	.15	
NH ₃ -N .....	.37	.28	.37	
Hardness (ppm CaCO ₃)				
Cl	6	8	8	
A.P.S. MBAS.....	<.01	<.01	.03	
xxx ... Total P.....	.13	.14	.07	
Cu				
Zn				
Cr				
Phenol				
Ca				
Mg				
Al				
Pb				
Na				
Fecal Coliforms per 100 ml.	25	75	50	

All results in milligrams per liter unless otherwise noted
< means less than.

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